

# New Energy Technologies

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Research on advanced aerospace systems and new energy sources

## Commercial exploration of space

### Also in this issue:

- New experiments on magnetic motors
- Ball lightning in laboratory environment
- Alternative aircrafts and space propulsion systems



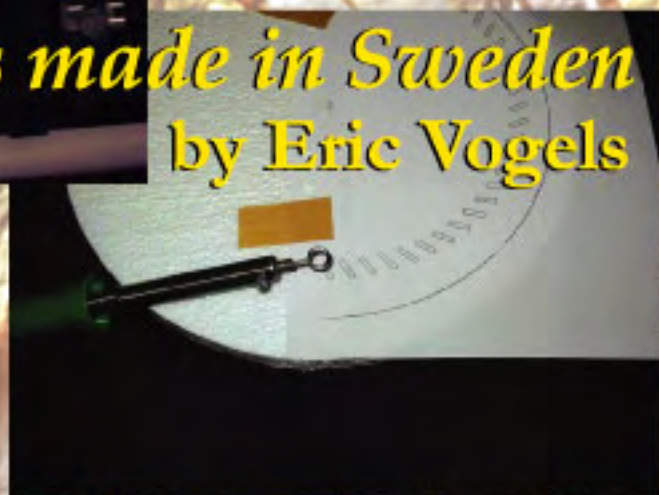


**Rotating device  
powered by  
permanent  
magnets**

## **Minato Wheel**

<http://fdp.hemsida.net>

**Experiments made in Sweden  
by Eric Vogels**



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"Commercial exploration of space"**

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**"Lightcraft" is made  
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# ***Ball Lightning control***

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**The standard  
ball formation**



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# Perfect Energy Source

## Minato wheel. Experiments in Sweden



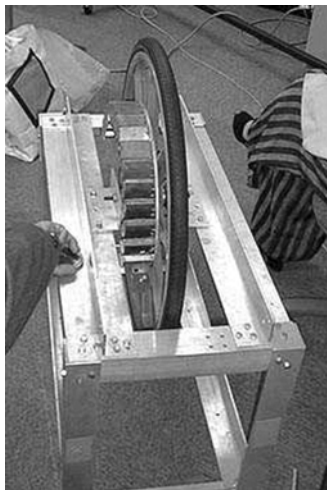
**Eric Vogels, Sweden**

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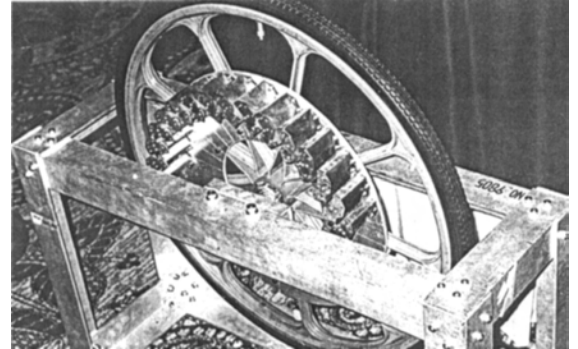
The self-running bicycle wheel was shown to the public at the First International New Science Symposium in 1997, held in Korea. The inventor of the wheel, Mr. Kohei Minato, was a speaker during the symposium. On [www.keelynet.com](http://www.keelynet.com) you can find the quote of an eyewitness:

"The motor is actuated by moving the N pole of a large permanent magnet (the drive magnet) toward the wheel. As this magnet is moved toward the wheel, the wheel starts to spin. As the magnet is moved closer to the wheel it spins faster.

The acceleration of the wheel is rapid. So rapid in fact, as to be startling. To put it another way I was very impressed. The motor works. And it works very well. In the film clip (see <http://fdp.hemsida.net>) a slight pumping action of Minato's hand holding the magnet is apparent. When I braced my hand so that there was no pumping action, the motor still ran. In fact it seemed to run better.

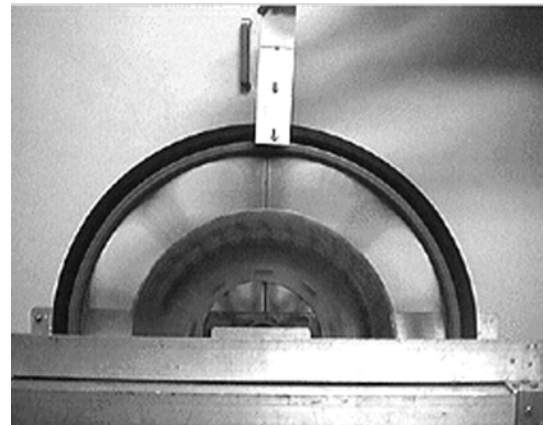


**Fig. 1**

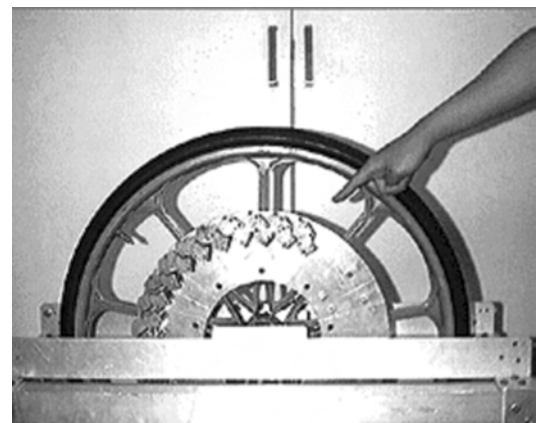


**Fig. 2**

Pumping action by the hand held magnet **is not** the power that drives the motor. When the drive magnet is moved away from the wheel it coasts rather quickly to a stop and comes to rest in a manner typical of any spinning bicycle wheel. Again when the wheel is at rest and a large magnet is moved up to the wheel it starts to spin. At no time it is necessary to touch the wheel to get it rotating."



**Fig. 3**



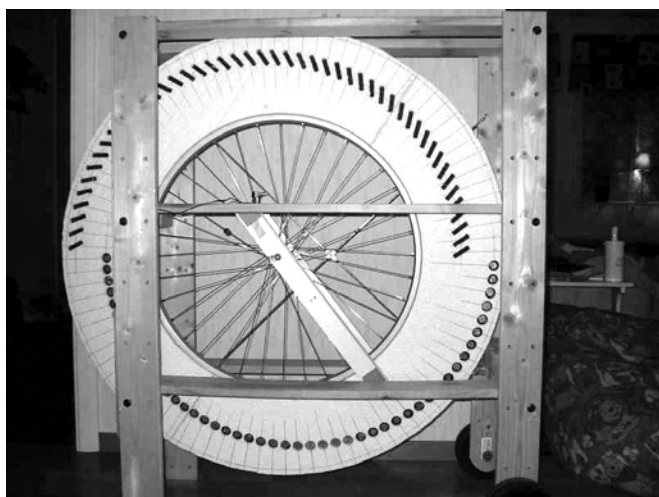
**Fig. 4**

Since the symposium in 1997 and the first publications in the Internet several people have tried to replicate the wheel, as it seemed to be a **perfect energy source for the future**. Some claims are made that replication was successful but no proof in the form of pictures or video clips are given.

Because I have a great interest in magnets and free energy and the fact that I did a lot of experiments to find a device that could be rotated only by means of permanent magnets, I decided to try to replicate the wheel by myself.

This journey started by searching on the Internet and collecting all the material that was available. A good way to sort all the found material was building my own website at <http://fdp.hemsida.net> where all my findings are presented.

One of the devices I build was made from a 'how to build a Minato wheel'-manual that I found on the Internet.

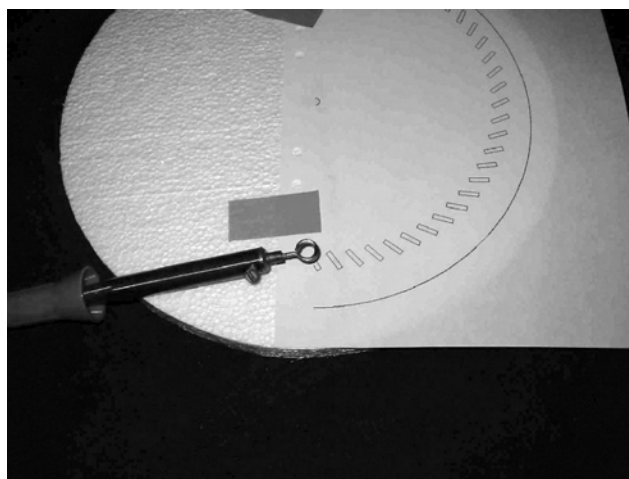


**Fig. 5**

Unfortunately this wheel did not show any movement at all. I mounted the magnets at several angles and distances from the rim without achieving any positive results. Since the size of the wheel (1 meter diameter) was not very practical to handle and since the results were negative I searched for an easier way for testing. I found that the use of Styrofoam, an old turntable and Neodymium disc magnets kept the whole project within the edges of my kitchen table. I developed a computer program to help me design wheels, since I want to be able to replicate my own wheel, in case I find a model that works. I do not believe in an engine that works after several weeks of tuning and that fails to function as soon as one magnet is replaced. Individual tuning is okay to optimise a working design but if a design does not show the potential to rotate by itself it's a flawed design.

**After optimising the way to build the small wheels, I could design and make a wheel in 30 minutes.**

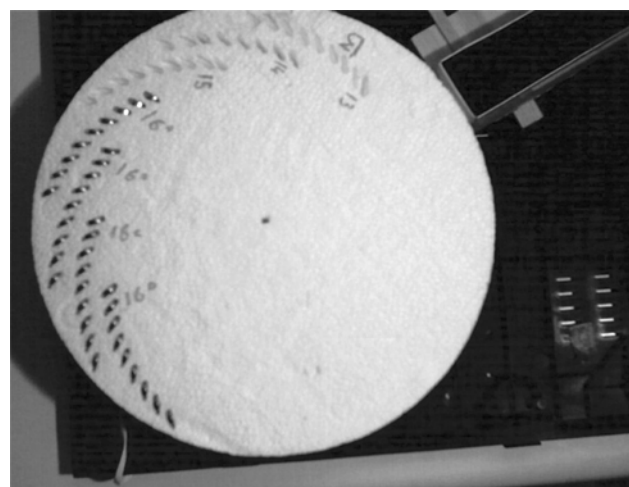
**I made a test scenario and the results for every test were posted on the web site.**



**Fig. 6**

I searched for the 'perfect' angle, number of magnets and position. The set-up with the strongest thrust was used as the base for the other experiment. By this time I realized that I was not really trying to rebuild the Minato wheel but that I wanted **a rotating device, powered by permanent magnets**.

When for the first time I decided to split a track of magnets that covered 180 degrees of the wheel in a number of smaller tracks, **the results became much better**.



**Fig. 7**

By using this way of placing the magnets, every track differs a little bit from the next track, depending on its place on the wheel. The angle of the magnets influences on the thrust that is given by the stator magnet, depending on the speed that the track is entering the magnetic field of the stator. In other words: the track at the beginning of the wheel, with magnets covered side of the wheel, gives less thrust than the track at the end. This is important since a track with a lot of thrust has a big 'sticky spot' that should pass the stator. This 'sticky spot' stops the wheel during its rotation just before the first track enters the magnetic field of the stator.

During the last experiments the stator magnet changed place and pushed against the magnetic fields of the tracks from above. Simply because more thrust was developed by this way. The next wheel will have the tracks mounted on a different level. It means that the first track will have a bigger distance to the stator magnet than the last track. This should make the sticky spot weaker and the final 'kick off' stronger. The final wheel will be mounted vertically, like the Minato Wheel.

Thanks to the invention of the Neodymium magnet in 1983, magnets became much more powerful while the size and length decreased. Before 1983 a lot of the

experiments could not be done since the size of the magnets made the positioning of several magnets in tracks like this was impossible. It is my personal believes that the strength of these magnets will lead to results that are impossible according to the physical law books, because these magnets did not exist when those books were written.

Until the moment I write this I have not found the perfect energy source yet but by exploitation all the material and findings on my web site I hope that more people get interested and will help searching for a great energy device that will not pollute the air which our children and grand children have to breath.



Sergey A. Gerasimov, Russia

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*The article presents results of the experimental study of the motion created by vibrations of an internal mass of the system of bodies accompanied by impacts of the unbalanced load with the external body. This type of propulsion drive is known by a number of names. Among these are the **vibrational propulsion device** and **reactionless machine**. Sometimes it is called the **inertioid** [1, 2]. The vibrational transposition is proved to go on by means of internal forces of a system of bodies [3-5]. The Tolchin's inertioid [6] is considered to be the first device that used the forces of inertia to create the reactionless infinite motion in space. We are not in a position to be a judge of this. There exist a number of projects of such machines but experimental results concerning such kind of motion are very limited. Below there are the experimental results on average velocities of such a motion and the description of a propulsion device a main particularity of which is absence of wheel-drive.*

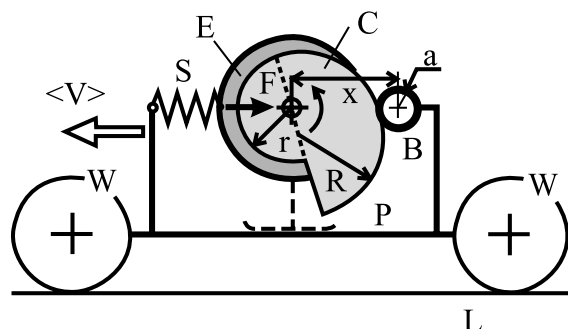


Fig. 1

Schematic representation of a vibratory-impact self-transposition

The unbalanced load in this device is an electric motor  $E$  of mass  $m$  that executes undamped vibrations

relative to a platform  $P$  of mass  $M$  with four wheels  $W$  which can roll on a horizontal surface  $L$  with rolling friction the coefficient of which is  $k$ . The frictional force is determined to be a force which adjusts to keep the cart from motion across a surface. A disk cam  $C$  at one end of the axle of the motor ensures a prescribed character of the vibrations and elastic impacts between the load  $m$  and the follower  $B$  of radius  $a$ . In present experimental device, the cam  $C$  consists of two semicircles of different radii  $r$  and  $R$  as it is shown in Fig.1. In this experiment  $r=0.03\text{m}$ ,  $R=0.05\text{m}$  and  $a=0.01\text{m}$ . The electric motor and the platform are coupled by a connecting spring  $S$ . The force  $F$  by means of which the electric motor is pressed to the follower varies linearly from  $F=4\text{N}$  at  $x=0.04\text{m}$  to  $F=4.8\text{N}$  at  $x=0.08\text{m}$ . The compressed spring  $S$  is necessary not only for creating close contact between the cam and the follower. The restoring force of the spring produces the transposition of the cart in a direction opposite to  $F$  when the follower moves without contact from  $x=2R-r+a$  up to an impact at  $x=r+a$ . The impact suppresses the transposition. Another mode of transposition is also possible when the impact of the cam on the follower is a reason of the transposition of the cart in the direction of the force  $F$ . In this case the frictional force extinguishes the transposition of the cart.

Friction between the load of mass  $m$  and the cart is negligible since the corresponding effective coefficient is less than 0.001. The same is for the friction between the cam and the follower. The mass of the spring is  $m_s=0.007\text{ kg}$ , and the mass of the cam is  $m_c=0.019\text{ kg}$ . The total mass of the wheels is  $m_w=0.082\text{ kg}$ . This value can be useful for a theoretical



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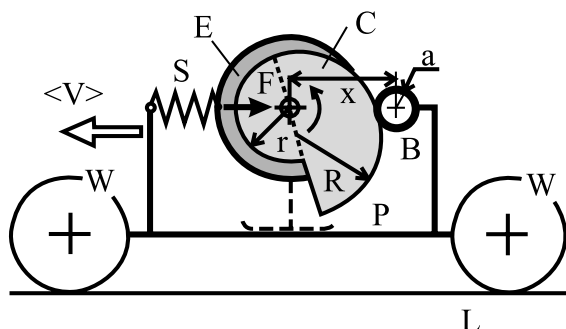


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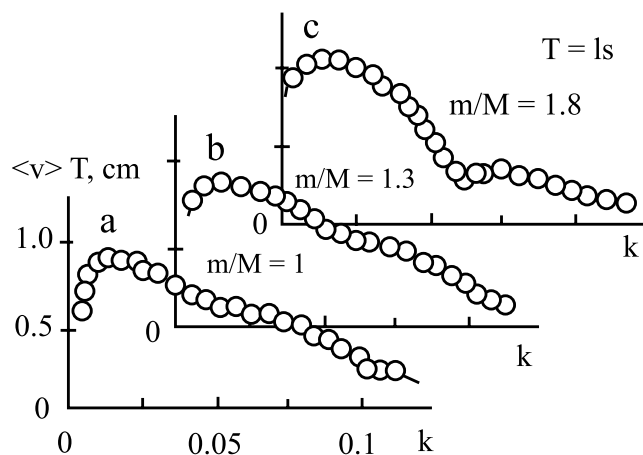
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analysis. Thus, the total mass of the unbalanced body is chosen to be much larger than the mass of the cam or the spring:  $m = m_E + m_C + m_S \approx m_E$ .

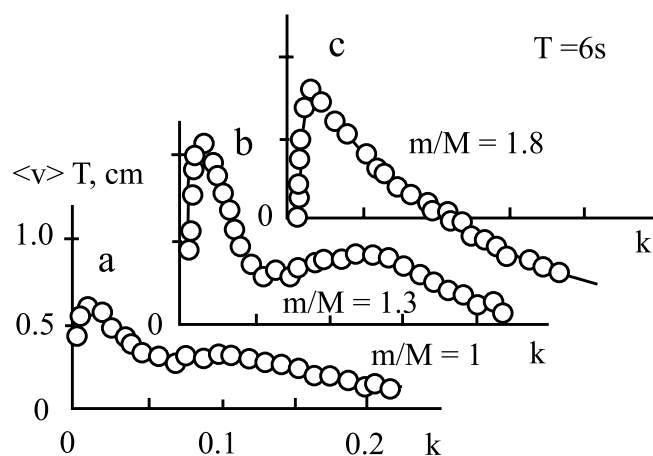


**Fig. 2**

Frictional coefficient dependence of average velocity of the platform at the period of vibrations  $T=1s$  for various mass ratios  $m/M$ :

(a)  $M=0.9$  kg, (b)  $m=1.2$  kg, (c)  $m=1.6$  kg

At least in the case of irreversible mode, one could expect that the value of average velocity of transposition  $\langle v \rangle$  must be proportional to the number of impacts per unit of time. In the other words the path traveled by the cart per one impact must not depend on frequency of vibrations. This is a reason why the dependence of the product  $\langle v \rangle T$  versus the value of the friction coefficient  $k$  and ratio of masses  $d = m/M$  is investigated in this work. Measurements were carried out for two magnitudes of rotation period  $T=1s$  and  $T=6s$  of the cam. The obtained results are presented in Fig. 2 and Fig. 3. First of all, the assumption mentioned above is not confirmed.



**Fig. 3**

Average velocity of the platform  $\langle v \rangle$  as a function of frictional coefficient  $k$  at  $T=6s$  for various mass ratios  $m/M$ : (a)  $M=0.9$  kg, (b)  $m=1.2$  kg, (c)  $m=1.6$  kg

The value  $\langle v \rangle T$  for the period of the rotation  $T=1s$  sufficiently differs from that for  $T=6s$  measured at the same conditions. Besides, when the mass ratio is large the cart can change its direction of transposition. The reason of these results is not clear but this device provides a challenge to explain and investigate this kind of motion that enables us to discover the reactionless motion if it is probable. One should pay attention to a fact that the infinite transposition of the platform takes place even if the friction coefficient  $k$  is small.

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## About the Author



Sergey A. Gerasimov graduated from Faculty of Experimental and Theoretical Physics of Moscow Physical Engineering Institute in 1976. Received Degree of PhD in Physics and Mathematics in 1987. Author of about 70 articles on Astrophysics, Atomic and Radiation Physics, Classical Electrodynamics and Mechanics. In present -

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# ***Production of Ball Lightning in Laboratory Environment***

**Report by our correspondent Alla Pashova**

Three years ago a working device producing a ball lightning in laboratory environment was designed in Saint-Petersburg Institute for Nuclear Physics (SPINP). The produced ball lightning is accessible for detail investigation and quite stable. The lifetime of the ball lightning comes to about one second that is rather significant for alike artificial formations. The experiments on the device made by scientists of SPINP, i.e. A. E. Egorov, G. D. Shabanov, S. Stepanov, are not supported or financed. Let us note that every scientist of the group searches proofs for his own hypothesis of nature and structure of the ball lightning at all.

A leading expert of SPINP, Anton I. Egorov, pays attention to dethronement of scientific myths:

— There is a myth of ball lightning that is created by mass media. The mythical ball lightning is a concentrate of mysterious energy which is extremely dangerous for a human. It destroys houses, kills animals, pursues people. After meeting it a human can lose his hair or teeth and different misfortunes begin to happen. Supposing a simple story of a farmer-eyewitness: "It thundered, and a fist-sized fire ball rolled down along a drainpipe. It fell into a barrel of water, the water gurgled. I came up to it and put my hand into the water. The water seemed to become warmer...". After republishing of the story by several newspapers a dramatic story about a ball lightning which has evaporated a barrel of water appears. No wonder that such familiar attitude to facts causes hundreds of hypotheses of ball lightning nature.

— **What is your hypothesis about ball lightning structure?**

— At the beginning of 90<sup>th</sup> I. D. Stakhanov, a member of Institute of Magnetism (IZMIRAN), developed a special method to interview eye-witnesses that resulted a right notion on ball lightning phenomenon. According to Stakhanov, ball lightning is a clot of hydrated plasma which is generated in wet air at electrical discharge.

Water as a chemical compound is remarkable for its anomalous properties: combining of two lightest elements does not generate gas but produces a high-boiling liquid. This is caused by extremely irregular distribution of electrons in a water molecule. Due to this property it acquires properties of an electric dipole. Water molecules interact with charged ions, aerosol particles, and with each other in a special way.

If a positive ion and a negative ion are introduced simultaneously into a puff of warm wet air then water dipoles immediately produce hydrate shells around the ions. When the hydrated positive ion approaches the hydrated negative ion additional water molecules are drawn into gaps between them. As a result, there is a stable cluster in which the charged ions are conserved. The cluster consists of two ions of opposite charges and the hydrate shell. Water molecules prevent the ions' approaching and recombination, hence, lifetime of the ions in the cluster increases up to tens of minutes, i.e. in 12-13 orders. Interaction of clusters causes open-chain structures followed by space structures. That is to say, there is appeared a clot of cold hydrated plasma that accumulates great energy (up to 1 kJoule per liter). The clot of plasma loses this energy at recombination of ions.

— **Could you, please, tell about the design of the device? What processes proceed when the device is operating?**

— Our task is to introduce an abundant population of ions into a puff of warm air saturated with water vapors. A base of the device for laboratory reproduction of ball lightning is a capacitor bank which is able to be charged up to 5.5 kV. The positive pole of the capacitor bank is connected to a ring electrode by means of a copper bar. The ring electrode is placed on a bottom of a polyethylene reservoir filled with water. The negative pole of the capacitor bank is connected to a carbonic electrode which is placed in the centre of the reservoir near water surface. A quartz pipe encloses the electrode in such a way that it is possible to drop water or to put some natural matter on it.

To generate a ball lightning 2-3 drops of water are put on the electrode. When impulse discharge occurs a bright plasma spout escapes the centre of the electrode that is accompanied by a quiet plop. A glowing plasmoid which is an artificial ball lightning parts from the plasma spout. It comes up slowly in the air and then disappears falling to pieces in 0.2-0.3 seconds.

We have made thousands of experiments for investigation of ball lightning properties, i.e. defining size, lifetime, colour, average temperature, excessive charge, content of a dust component.

It was ascertained that the artificial ball lightning is generated in a narrow interval of breakdown tensions. The average size of such a ball lightning is 12-20 cm,

and its lifetime comes to 1 second. Temperature of the ball lightning is not very high, i.e. 50° C. This can be defined if to take into account speed of rising of the ball lightning. If the plasmoid is accepted as a puff of warm wet air of 14-centimeter diameter which in atmosphere comes up at 293 K at speed of 1-1.2 m/sec then, consequently, its temperature should not exceed 330 K.

Colour of the lightning varies greatly and depends on presence of aerosol of matter trapped in the moment of discharge. Usually the lilac central part of the plasmoid is surrounded by a diffusive yellowish layer. Some admixture of sodium salt and calcium makes the core of the plasmoid yellow or orange.

If the central carbonic electrode is replaced by an iron or copper or aluminum one then the fundamental character of the phenomenon does not change. However, colour of the plasmoid depends on a radiation spectrum of excited atoms of the electrode, i.e. iron plasmoids are whitish, copper plasmoids are greenish, aluminum ones are white with reddish shimmer.

— **A generated ball lightning exists for about 1 second. How can it be made more stable?**

— Lifetime of an artificial ball lightning depends on many conditions, i.e. size and geometrical form of the central electrode, voltage between the electrodes, value and duration of a current impulse, temperature and electroconductivity of water which is put on the central electrode. Besides, lifetime of the plasmoid can be changed by introducing an additional dispersive phase into it. We have tested tens of matters and begun to investigate suspensions of colloidal graphite and fine-dispersated ferric oxide.

A suspension of 3 g of colloidal graphite, 8-10 ml of acetone (which played role of penetrating agent), and 90 ml of water is put on the central carbonic electrode. When an electrical discharge occurs a layer of the suspension forms a flying spherical plasmoid. It comes up slowly and disappears in 0.3-0.8 seconds. The core of the plasmoid has a colour of flame, i.e. colour of burning carbon.

To prolong the existence of the generated ball lightning without application of aerosols it will be possible to use the so-called "Faraday's cylinder" whose production has been already begun. For the same purpose G.D. Shabanov proposes to put a stopping potential on a probe of detention.

— **There is an opinion that physical nature of ball lightning is similar to the process of controlled thermonuclear fusion. In this case, if your work on generation of a stable ball lightning is successful then you will be a competitor of the expensive project of controlled thermonuclear fusion.**

— I think that it is totally incorrect. Hydrated

plasma is the first enemy of the thermo-nuclear fusion as water molecules do not allow neutrons approach each other. Effective cold fusion should be realized in organic liquids, for example, in heavy acetone or in a water-free medium. Somehow, it should be an absolutely "dry" process. No experiments on real "dry" cold fusion have been realized in practice. It has not been also examined the surfaces on which the combination of heavy hydrogen atoms produces maximal heating.

Scientists should pay attention to two most effective cold fusion processes. The first one expects association of two atoms of deuterium occurring on a totally dry deuterated surface which consists of, for example, zirconium deuteride. In the moment of fusion of a deuterium molecule local heating appears, and neutrons depart. The other perspective method of realization of the cold fusion process requires an absolutely "dry" organic liquid, i.e. liquid acetone in which hydrogen atoms are replaced by deuterium atoms ( $C_3D_6O$ ) or by atoms of cyclic compound of  $C_6(D_2)_6$ . A tellurium or zirconium tip of an ultra-sonic dispersant is placed into a reservoir of this liquid. Cavitation blebs are formed on the surface of the dispersant. Neutron output comes to  $10^4$  particles. Maximal neutron output, which was achieved by Lipson, an American experimenter, consists of  $10^8$  neutrons at a desired result of  $10^{13}$ . Certain quantity of neutrons can be obtained during ultrasonic cavitation which is accompanied by a phenomenon of sonoluminescence. Due to sound resonance the only cavitation bleb is generated in acetone. When the bleb collapses weak glowing is observed. The cause of this phenomenon consists in gas heating occurring in the bleb that is the result of high pressure produced by its collapse. The burst can last from 1/20 up to 1/1000 sec. Light intensiveness depends on quantity of gas in the bleb. If gas is absent in the bleb then the glowing does not occur. Light emission of the bleb is very weak, it becomes visible if it is strengthened or in absolute darkness.

— **Is it rightful that cold fusion is the future of world power engineering?**

To my mind another direction seems to be more perspective, i.e. extraction of uranium from sea water and then its burning in heavy hydrogen reactors like one which exists in Canada. Photo voltaic accumulators can also become a successful approach of the alternative traditional fuel engineering. By the way, a working model of such a device to utilize free solar energy has recently been created in our Institute (official web site: <http://www.pnpi.spb.ru>).

*Editor: Read the publications on this theme in following issues of our magazine. Below there is a description of other attempts to generate a ball lightning in laboratory environment or at home. Besides, we publish an article dedicated to the problem of laser control of ball lightning. In the article there are photos (also see the cover page) and a scheme of the working device designed by this scientific group.*



# Ball Lightning Experiments

Information from  
[http://www-personal.umich.edu/~reginald/ball\\_1.html](http://www-personal.umich.edu/~reginald/ball_1.html)

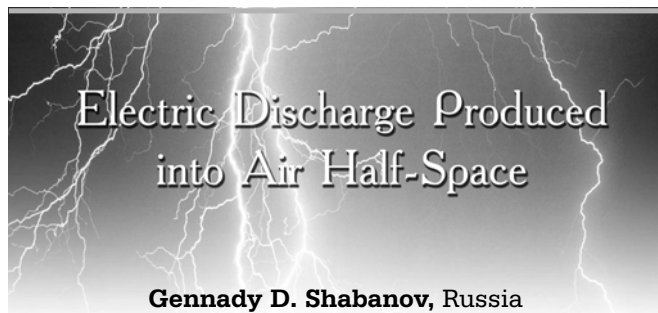
## Ball Lightning in the Microwave

This is a great experiment to try at home. It requires a microwave oven, a candle, a toothpick and a lighter. First you put the candle (~1-2 inches in height) in the microwave (remove glass plate from bottom so candle sits on metal). Put the toothpick in the candle sticking straight up. Light the toothpick on fire so that flames are leaping off the tip. Shut the door quickly and turn on oven full blast. There will be loud popping noises and then balls of fire will leap from the toothpick and

fly around inside the microwave while making a buzzing sound like a bee. If it doesn't work at first try to move the position of the candle in order to find the "hot spot" in the oven for it to work.

## Real Ball Lightning Generated by Pulsed Power Inductor

This experiment is very DANGEROUS. The author did this one a few years ago. The Idea was got from an article about a guy generating ball lightning using a high current transformer (TBA). The author had an idea of using an inductor to store large amounts of electrical energy. The conductor on the end of the stick touches the metal ring. This completes the circuit, and start the inductor. Then there was used the air compressor nozzle to blow out the arc as the wire was pulled away. The copper wire explodes and creates rapidly rotating and burning molten balls of copper. These 'Balls of Fire' exhibit many of the properties of real ball lightning.



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"there are many difficulties of fundamental and practical importance on this path".

Weak theoretical understanding of lightning generation causes pessimistic estimations of solution of the problem. The article [2] notes particularly that "there are neither adequate theory, nor numerical calculations and qualitative understanding of the phenomena defining the speed of a leader... The situation of a theory of the leader channel is little better (from quantitative point of view)...".

Realistically the following statement can refer to the lightning discharge: "The electric discharge appeared to be very "unhandy" for theoretical description but the most interesting phenomenon in the experimental aspect" [4].

**In the article a possibility of streak lightning control by means of low intensive laser emission is observed.**

During investigation of an electric discharge into air half-space [1] it was noticed that this discharge can be controlled by a low intensive laser beam. Now there is a problem of laser control of lightning discharge [2]. However, numerous works on this approach demonstrate that "the hope to get a quick solution of the problem of lightning control by laser emission has not been confirmed" [3].

Careful observation of this problem in [2] has shown ways out the situation. The authors of [2] consider plasma channel produced (by means of laser) in free atmosphere at a possible greatest height to be of doubtless interest of the science of lightning. Finally, creation of the plasma channel should be of benefit for lightning protection. The authors of [2] give notice that

## Experimental Part

In this work a capacitor bank with 0.6 mF capacity, which can be fed up to ~5 kV, was used to produce impulse discharge into air half-space. A scheme of the device is presented in Fig.1. At connection/disconnection of a discharger 5 a "spout" is let out of an electrode 3. The spout carries the potential of the cathode (virtual cathode) at a significant height into air half-space. A probe placed at the height of ~15 cm fixes a potential which is similar to the potential occurring at the cathode. The researches have demonstrated that the produced formation continues to glow for several hundreds of milliseconds (the glow is fixed from a zone located at 15-45 cm above the cathode). Typical time of the discharge comes to  $100 \pm 20$  msec and depends on the cathode material. Electric field generated in the spout comes to less than  $8 \text{ V cm}^{-1}$ .

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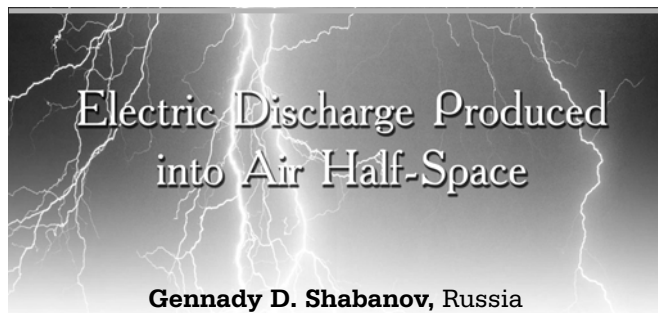
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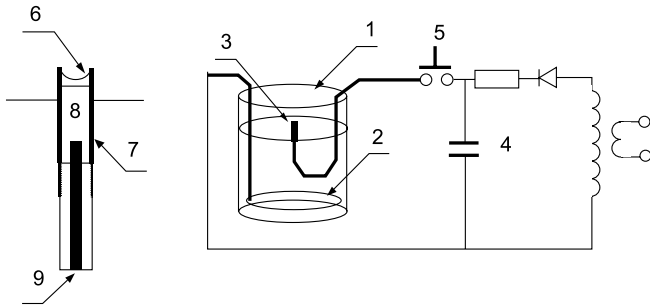
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**Fig 1**

A scheme of a device made for producing of long-living plasmoids

1 – a polyethylene reservoir, 2 – a ring electrode, 3 – a central electrode, 4 – a capacitor bank of 0.6 mF capacity, 5 – a discharger, 6 – water or aqueous suspension drop, 7 – a quartz pipe, 8 – a carbonic or metal electrode, 9 – a copper bar.

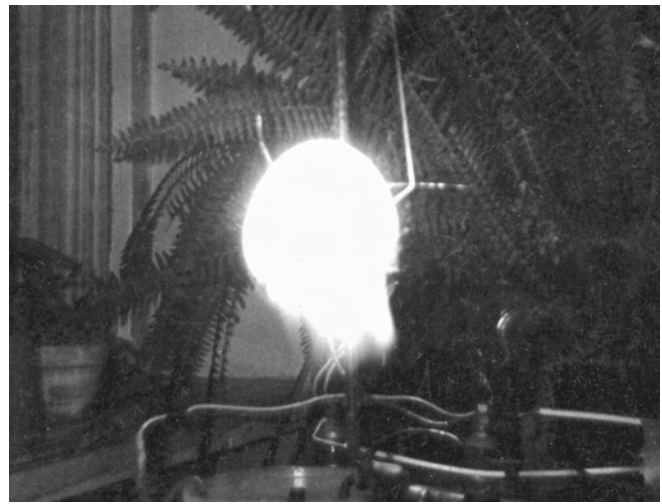
The spout was acted by weak laser emission of less than 1 mW at 22-centimeter height. The laser beam was directed perpendicular to the discharge axis, the spout achieving the laser beam moved along the beam towards the laser.

In Fig.2 the spout has moved ~8.5 cm along the laser beam, and a usual sphere formation was generated. Due to the horizontal motion it was distorted if to be compared with usual sphere formation. The usual sphere formation is represented in Fig.3 (also see the cover).



**Fig. 2**

Motion of the leader channel (spout) along the laser accompanied with the sphere formation



**Fig.3**

The standard ball formation

## Discussion

As it is evenly mentioned in [5], results of model experiments are difficult to be applied directly to laser control of lightning because in short intervals characteristics of the discharge differ from characteristics of lightning discharges. Actually, at comparing considered current and the field existing in a lightning ( $i \sim 100$  A,  $\sim 3$  V cm<sup>-1</sup>) with these phenomena occurring in a laboratory spark ( $\sim 1$  A,  $\sim 300$  V cm<sup>-1</sup>) incorrectness of modeling of this process becomes obvious. From the other hand the authors of [2] note that “the leader channel is like a channel of electric arc... At current strength of  $\sim 100$  A plasma of the channel of the arc is supported by fields the densities of which come to several volts by a centimeter. The lightning has such leader currents”.

Even an air arc of atmosphere pressure has a field of about 100 V cm<sup>-1</sup> at currents of about 1 A. The generated discharges (spout) accompanied by the field of less than 8 V cm<sup>-1</sup> (maximal current appearing in the discharge gap is 50-60 A) are more appropriate for modeling the leader channel of the streak lightning than typical discharges used for investigation of these processes, for example, like [6].

At first approximation the leader channel is considered as an ideal conductor in the article [2]. We make research to define the field in the discharge (spout) more exactly. The article [2] makes the following consideration about a cause of occasional generation of new leader heads: “the surface of *equipotential* plasma conductor (channel) has a property of *instability*. There is an occasionally generated sharp jut. An intensified field appears at the jut along the edge. Under the influence of the field the jut becomes to grow in any direction including at the significant angle to the weak outer field”. The aforesaid seems to explain why our leader channel changes its direction and runs at right angle to its initial motion. (Fig.2). Weak harmonic action of the laser beam to the leader channel causes generation of a new head which continues motion “on the significant angle”.

The effect of plasma motion towards a light beam is a demonstration of a general tendency of propagation of the discharges to an incident electromagnetic field [7]. "Area occupied by plasma usually increases towards the laser emission" [8]. Leading character of motion of this formation is confirmed in [9] as well as the interaction with the laser beam is confirmed in [10]. It should be taken into account that in the works [9-10] experiments were performed at devices which generated such a discharge. However, that discharge was by 2 orders weaker than the discharge generated by the device represented in this work. Naturally, the results were less defined. Comparison of the discharges is presented in [11].

According to our data, the leader channel (spout) has a very abrupt bound (less than 1 mm). In this layer the field can come to  $\sim 30 \text{ kV cm}^{-1}$  (at height of 15 cm).

### Conclusions

Due to the assumption [2] about *instability* of the surface of the *equipotential* leader channel there has been successfully performed the "control" action on an electric discharge which models a streak lightning. It has been achieved by means of weak harmonic oscillations made by the laser. This mechanism is supposed to be applied for streak lightning control.

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# Free Energy

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In general the conception was formulated in 1995 and today we can say that the concept of physical vacuum, which is a new source of energy, finds more and more supporters. The fundamental works about nature of "zero point energy" are published, for example, Andrew D. Sakharov [1], Hal T. Puthoff [2] and many other interesting works. It is clear now that space or "physical vacuum" has its internal structure, therefore it can be used as a new source of energy if we organize the process of changing of this structure. Moreover, according to some theories, the existence of reality (i.e. the World of some certain parameters of space and time) is defined by the function of probability of energy density. For example, Dr. Nassikas, Greece [3], proves that it is not possible to consider the space without its energy, and there is no space without energy. The internal structure of reality is coexistence of two forms: gravitational energy and electromagnetic energy. Any local increase of the first one should produce decrease of the second one, so the sum amount of the change is zero.

In some other articles about energy transformation processes (gravitational form of energy into electromagnetic heat radiation of mass, for example) we can find that both increase of entropy and the inverse processes (decrease of entropy) are possible and in this case the electromagnetic energy can be converted into the gravitational form, that is shown in details in the works of Nobel laureate I. Prigozhin, Order and Chaos. Man's new dialog with Nature, London, 1984. Since **the direction of time** (the time course) and **direction of the entropy change** (increase or decrease) are related notions then free energy technologies are considered by Kozyrev as methods of practical application of natural time course [4] that is presented in aether-dynamics by Frolov as aether flow of some density and this aether density determines the time rate as hardness of cause-effect connections for any process, and also for the process of existence of matter in space-time of this aether density.

According to this theory, in any point of space it is possible to get power by means of energy transformations without any consumption of mass-fuel. We can say also that in this case some change of the energy density of space should be detected.

Let's clarify some determinations:

1. The Potential (lat. Potentia that means "force"). In physics this is scalar parameter, it's gradient expresses the intensity of field of a certain force. In common sense, the potential is possibilities, which

exist for execution of some task, for completion of some work.

2. The Work is a quantitative parameter of energy transformations. The transformation means here change of form.

3. The Energy (Greek "Energie" means "action, activity") is a quantitative characteristic for different forms of motion.

4. The Power is amount of work per unit of time.

According to the given determinations by The Soviet Encyclopedic Dictionary, edition of 1988, Moscow, **the fact of presence of potential (scalar) field, for example, electrical or gravitational field, is real possibility to produce some work if we can organize change of energy forms. Let's note that power source is not required to keep the potential field in force. It is free.**

***...the potential (scalar) field can produce real work!***

The example of this work, which is produced by the field: body falls in gravitational field and when it strikes on the ground then some part of its potential energy is transformed to heat, that is the work as transformation of energy forms. So, there is a conclusion: the potential (scalar) field can produce real work! But we have considered only a half of cycle and in classical case in the second half of the cycle it will be necessary to produce the same work against the field to raise the body to the initial point.

Let's formulate the task to produce the work periodically and to get the power in load from this process. Usual mistake is to accept the particular case (the same body returns back in the same field) as a single possible case. But in special case changes of the system are possible, for example, the field intensity is not a constant but some variable value (alternating or pulsing), or the body changes its own parameters. In this case in each of half-cycle of the process the field can produce real positive work to accelerate the body.

The main technological solutions are obvious: **it is necessary to create gradient of field in space** (full or partial screening of trajectory of the body, which is moving in the field) **or gradient of field in time** (pulsing mode of field). This is quite easy for electric and magnetic fields, but for system, which uses gravitational field to produce the work, we can assume changes of parameters of the body only.



It is possible to understand why professional physicists dislike the question about possibility to use scalar (potential) fields to produce useful work in a load since they think about The Law of Energy Conservation. To find mutual understanding it is necessary "to upgrade" this Law for 4-dimentional case of real physical system. It is necessary to introduce **the notion of the structure of space-time** where the considered process is created. In other words, for real practical engineering tasks it is necessary to consider **space-time of the real process** but not an abstract space-time. Usually the energy density of technical processes is small in comparison with natural energy density of space (aether density), which is a result of real astrophysical processes, i.e. motion of planet, star, galaxy. If we discover structure of this real rhythm of the space-time of our planet then we'll be able to design it in our technical devices to use aether-dynamics as theoretical basis.

So, in orthodox physics there is the unchallengeable formulation: the work of potential field on closed trajectory of motion is equal to zero. Yes, it is right for only case: if one part of work is positive (the acceleration) and another part is negative (the deceleration). But one part of the trajectory or a part of periodic process with the negative work can be excluded by different methods: by means of spatial superposition, pulsing mode and change of interaction polarity or by the screening of electromagnetic interaction.

For example, minor changes in vacuum tube design (the grid is located under cathode) allows increasing the kinetic energy of electrons and to increase emission current by means of the potential on the grid only. Also vector potential of magnetic field or gravitational potential can be used by similar way.

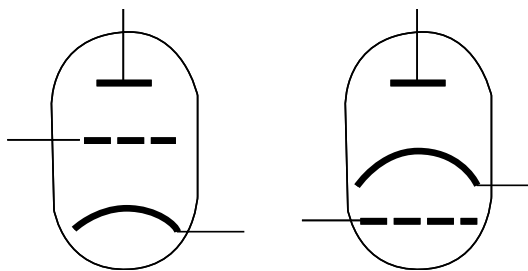


Fig. 1

Besides this way it is possible to use pulsed mode and switch-off the primary energy source before the emission electrons will reach the anode, Fig.2. In this case there is not the conductivity current between anode and cathode and the primary source is not discharging during its work.

Therefore, it is not a news that potential field can produce real work. In any textbook there are examples of positive and negative half-cycles that result to zero net work. But for the case of consequent execution of two processes the parameters of one of the processes

can be changed, that **the work, which is produced on the closed trajectory can be formed as two or more parts of positive work**. Important aspect is following: it is necessary to determine the point (moment) of change the sign of the interaction and at that point (moment) to change the parameters of the process accordingly.

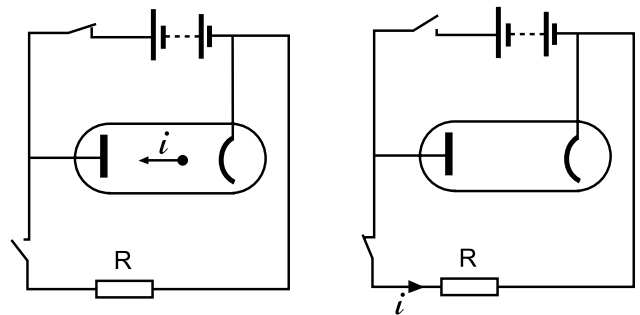


Fig. 2

The good sense requires the answer: what is the source of the power to produce this work if this proposed concept is right? Let's notice that before the considered examples, the existence of **power interactions of potential fields** must make the same question. For example, how the ordinary permanent magnet (i.e. its vector potential) holds a piece of metal making work against force of gravity without any fuel? How the potential field can move and accelerate ions, i.e. kinetic energy of ions can be increased without any fuel? What provides the forces of elasticity? Let's try to find answers from consideration of inner structure of electric and magnetic field, especially let's develop **our understanding of the notion of gradient, which describe properties of space-time design in area of this field**.

The concept of potential as bi-directional flow of photons and anti-photon was proposed by English mathematician E. Whittaker, and then it was developed by Dr. Thomas E. Bearden [5]. In this concept, the generalization of the Third Newton's law looks as the requirement of complementary pair to the process of the electromagnetic radiation. Since "process" means a change of information in time, this paired anti-process is reversed in time. Of course, it is development of process to its own future, but from our point of view, it goes from future to past. According to generalized Third Newton's law the radiation of photon is paired with anti-photon. In this case, the internal space-time structure of electric potential field is formed by two contrary flows of energy: photons spread from charge source and the anti-photon "inflow" into the charged mass. Let's notice that this concept defines the relationship of charge and mass. The charge without mass does not have any sense.

The flow of energy outgoing from charged mass is responsible for all phenomena of radiation. Incoming flow of energy is responsible for the gravitational interaction. Therefore, the notions "radiation" and

"gravitation" can be considered as complementary pair; that is considered in details in concept of Josef Hasslberger [6].

***...it is impossible to get "something" from "nothing"***

There is a quite correct question: since "something" can not be created from "nothing" then what and where will be changing if we create the process of free power dissipations in local area of our space-time by means of asymmetrical potential interaction?

Let's try to present a "process" as some change of "information" in time and from this point we'll get the conclusion about results of this energy disbalance of the natural internal structure of potential field: in this case the entropy process in direct time (heat dissipation in load) should be balanced with equal anti-entropy process in reversed time. In other words, the disbalance is change of the space-time curvature and changes in the time rate.

So, it is impossible to get "something" from "nothing" but if we have understanding of the balance (process in time and anti-process in reversed time) then in the Universe the 4-dimentional balance is not violated. It is assumed here that it is impossible to create one process but it is possible to create two opposite balanced processes, and each of them produce real work in the load. In astrophysical consideration it was stated in 1964 by Academician Gustav Naan, Estonia, Tartu. He wrote [7]:

***"In our real world we could extract any amount of energy from vacuum if some technology provides at the same time the extracting of the same amount of energy for anti-world. Total sum value of energy is equal to zero."***

Let's note also that similar conception of "dynamical zero" was applied in ancient India mathematics, i.e. "zero" is not "nothing" but it is hidden possibilities (balance of forces).

One more interesting question appears: what is about reality of the particle of matter after we have claimed that its mass-parameters are parameters of certain process? With this idea the material world as a whole is certain process and "stability" is not a property of some object but a parameter of its existence, which is a process in space-time of some certain energy density and some certain structure. By analogy the vortex in liquid is a process but it is not a liquid.

Thereafter, as electron was presented by Shredinger as wave packet and by Whittaker as function of two scalar potentials, the old idea of instability or **dynamic structure of matter** has the possibility of experimental testing and development as a

teleportation technology. This idea is technology of space-time engineering, i.e. creation of the space-time with some certain parameters where curvature (or rate of time) determined rate of existence of the matter in space. It is related with some energy density, which can be increased or decreased. Since by this way it is possible to consider any material particle of substance as certain process, which is balanced by corresponding time-reversed process, so there is no theoretical difficulties to develop technologies of chemical transmutation, materialization, dematerialization, teleportation etc.

So, the using of potential energy to create a process of dissipation of power in load does not violates the Law of Conservation, and this Law can be generalized: the total energy of four dimensional system is amount of energy of processes in time and energy of processes in reversed time, it is constant and it is equal to zero.

Now let's try to review some free energy projects (the systems to produce work without consumption of fuel). Russian Peter the Great had intention to visit Germany in 1725 to test the Orferius' device. There is a very old description of "perpetually rotating wheel", which was made in India by inventor Bhaskar in 1150! From that times the mind of inventors is developed to other modern systems but due to the efforts of scientific groups, which are interested to keep in force the ideas of primitive materialism, the great idea of free energy transformation is distorted to such extent that any person, who began to speak about free energy, had a chance to get the name of "mad". Why? The reason is common understanding of the "power", which is "some work per unit of time" and generally it can be presented only as result of some transformation of matter structure, i.e. disintegration, chemical reaction, nuclear decay, nuclear synthesis or any change of structure of a matter. In any case, a material (the firewood, oil products or nuclear fuel) is considered as the fuel, regardless of its transformation method.

Some concepts did not consider the fields (electromagnetic, gravitational and others) as a kind of matter. So hypotheses, and even successful experiments on transformation of "non-material" type of energy in energy of material object (into the work) were not taken into consideration. The physics is a study about measurable and tangible quantities. New measurement methods let us work with a new physical phenomenon. So, we can see that **real situation in alternative energy is changing due to experimenters efforts** but not from the great theoretical team.

Some time ago the electric energy was not considered as a material object, but gradually people have been able to refuse the gas pipes, which were real material source of power for the gas light lamp, in favor of electric wires for electrical illumination. In a short time, I think, it will be possible to refuse the wires and we'll

consider the aether (physical vacuum) as unlimited energy source if we organize **the process of transformation of space-time parameters**. It will be necessary to drop the old conception of "primary source of power", which should be connected with the consumer by some method and to develop conception of free energy source in any place "on-demand".

Let's consider, what the term "free energy" means today. The energy in general sense means the "ability of body to produce some work". The energy of closed system is constant. Certain device can look like "perpetual mobile", but nobody will be shocked because the way of energy "inflow" is known. For example, solar panel battery is obtaining its power from external source of light. But in general case, 3-dimensional observer can see nothing similar to the inflow of energy into the system if multi-dimensional energy balance is not analyzed. In other words, "perpetual mobile" is a right name since for its description it is necessary to use notions of "Time", "Eternity", "Causality" and other categories, which are more related with philosophy and religion but not with modern physics.

The "perpetual mobile idea" is really value to be the purpose of serious scientific work. In the book "Great experiments in physics" published by "World", 1973, Professor G. Lipson wrote: "Joule was the person of a very practical kind of mind and he was enthusiast of the perpetual mobile idea". I hope that it is not necessary to explain here who was Joule. However, "practicality" of free energy generators is obvious only for energy customers, but not for energy producers, who created the centralized system of energy distribution. This is the main reason of absence of alternative fuel-less energy systems in the modern market.

Let's consider the existing classification of "perpetual mobiles":

1. "Perpetual mobile" of the first kind is a design, which can "create energy". It is disputable aspect and all patent offices refuse to consider the patent claim of such type. They answer that "energy can not be created or destroyed" but energy can be transformed from one type into another type.
2. "Perpetual mobile" of the second kind is the collector of environmental heat. It is not a "thermo-pair" which uses temperature difference to produce electricity, but it is the "heat pump". This type of devices works with negative entropy, or more exactly, with sintropy. The terminology still is not defined but we can say that in entropy systems the produced work is equivalent to the dissipated heat and the work, which is produced by sintropy systems is equivalent to some absorbed environment heat.
3. The "perpetual mobile" of the third kind is a demonstration of perpetual motion without friction. The

analogue is electric current in superconductors. Development of this idea is creation of systems with negative friction. In electromagnetic systems it corresponds to the known cases of the "negative conductivity", i.e. some electrical circuits in this mode can generate output power.

Additionally, let's show that "creation of energy" is possible in theory, for example: two processes of equal power compensate each other  $A + B = 0$ . Let's assume that some technology creates another (inverse) process as:  $0 = A + B$  i.e. two processes of some power in sum create zero result. In general principle, also there is possibility to use many processes balanced situation as  $A + B + C + \dots = 0$  and this interesting conception is known as theory of multipolarity.

Let's consider some quite real (to my mind) examples from the history of development of free energy technologies. Nikola Tesla's investigations are not well known to modern scientists and engineers. In his works on development of wire-less telecommunication Tesla used flat spiral coils as a secondary winding of transformer. The magnetic field of such coil is radial and it is placed in the plane of the coil. In 1995 the author of this article experimented with similar flat spiral coils. I have to claim that when such coil is operating as secondary winding and the solenoid is the primary winding of the transformer then we can measure asymmetrical mutual induction, i.e. connection of active load (lamp) to output circuit of the transformer is free from input power in the primary winding. It is the simplest example of technical realization of the asymmetrical cause-effect connection, described by Kozyrev in his theory of active properties of time.

### **... "creation of energy" is possible in theory...**

Another Tesla's invention is his resonance transformer. Modern electrical engineering describes transformer with forced electrical oscillations and radio engineering considers operation of resonance systems mainly. Tesla put the question on transformation of power in resonance transformer and by this way the efficiency can be more than 100%. With high frequency currents and high power level Tesla used single-wire terminals as loads, i.e. the lamps and other single-wire receivers of power (motors) were powered from high frequency changing electric field. Such single-wire terminal does not consume any power from primary source because it uses the change of potential in point of connection to conductor (let's note also that for maximum efficiency this point of connection should be one of the maximums of standing wave).

The notion about "free vibrations" belongs to Tesla and this term describes sinusoidal oscillations in electric circuit that is created after short non-sinusoidal impulse due to real vibrations of the free electrons. Resonance mode of the free vibrations can be the real way to excess power output.

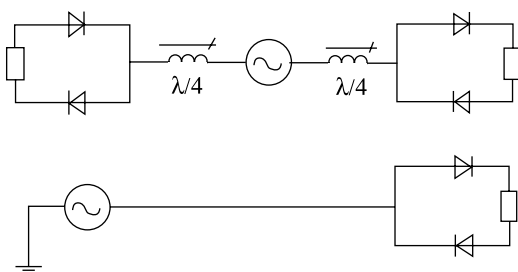


Original Tesla's approach to electrodynamics allowed him to build in 1934 fuel-less car with electromotor, which was powered from some 12 vacuum tubes generator of unknown design.

**The standing waves of electric field** that were observed by Tesla during thunderstorm brought him to conclusion about possibility of the system to power remote energy consumers from energy generator without any transmission lines and without radiation methods. He assumed that it is necessary to create special standing wave of electric potential (or variable in time electric potential field) around the generator, then the unlimited number of loads (lamps, motors) in area of this potential field can be powered if they are tuned in resonance with oscillations of the generator. Let's notice that in each receiver the power can't be more than power of this generator but it is possible to install many independent "receivers" without mutual interference.

The modern investigations on these problems sound as sensation, because Tesla's works are unknown for the modern generation of scientists. Of course, modern electronics components and the tools facilities allow to create real "miracles" in comparison with the past age experiments. For example, engineer Avramenko described his work on single-wire power transmission in Journal of Russian Physical Ideas, 1991, No.2, and in journal "Inventor and rationalizator" 1992, No. 5, 6. The light bulb (or ventilator) was used as load of the single-wire power transmission line. This line can be made of high resistance material, for example, tungsten, but the power can be transmitted without heating of wire! It is possible to say that in this experiment a wire does not transmit power from the generator to the load, but the wire is the conductor of information signal, which is created by polarizational current opened and described by M. Faraday.

It is not difficult to repeat the experiments with single-wire line: it is necessary to place two diodes on the end of a line, which is connected to secondary windings of high voltage transformer (I used television set high voltage unit) by such a way that different poles of the diodes are connected to the line, Fig.3.



**Fig.3**

Two other poles of diodes create the source of potential difference (voltage), from what it is possible to charge the capacitor or to power the load (luminescent bulb). This diodes scheme is named as

"Avramenko's diodes plug". In my experiments it was determined that high efficiency mode is resonance mode in real line and in this case the maximum change of potential is created in the point of connection of the "Avramenko's diodes plug". There is well known formulas to calculate this resonance as quarter-wave antenna vibrator system. Of course, high frequency and high potential allow creating high power in the load. In 2001-2003 New Energy Technologies magazine have published new experimental results on single-wire power transmission reported by research team from Moscow (Prof. Strebkov, Avramenko, Nekrasov and others). For example, they built and tested lines from 20 to 100 Kwtt power level!

***... the electric potential field can create non-compensated force in the system and to produce a work without any power input.***

One more well known researcher on the subject of free energy was Thomas Townsend Brown. He considered creation of reactionless propulsion force by means of electric forces only. Ionization is not considered here! According to his works, the electric potential field can create non-compensated force in the system and to produce a work without any power input. English patent by T. T. Brown #300,311 of August 15, 1927 describes the method to create propulsion force and power from electric energy source only. In this first patent it was claimed that in ordinary flat electric capacitor (two flat plates and dielectric between them), which is charged up to 50 kilovolts and more, Brown discovered propulsion force. This force moves the capacitor to positively charged plate direction. It is only one of his ideas and in his other patents of 1930 - 1965 Brown has described many new methods to create propulsion force and free power in load by means of electric field only (scalar potential field as a source!).

***... the efficiency of "electric system can be million to one"***

We have to exclude ideas on electrokinetic apparatus since it is just a reactive method and propulsion force is result of ionization flow. Especial case is Brown's **idea to create the asymmetry of electrostatic forces** by means of some special form of surface, USA patent #3187206 of June 1, 1965, application of May 9, 1956 (Fig 4).

The schemes and descriptions by the Brown's patents are undoubtedly the work of great practical value. As was mentioned by Brown, the efficiency of "electric system can be million to one" because the potential field can produce real work, for example, rotate some electro generator, but it does not change the primary source of field.

In 1927 T. Brown demonstrated the devices in Ohio, later he worked in France. His works in France were

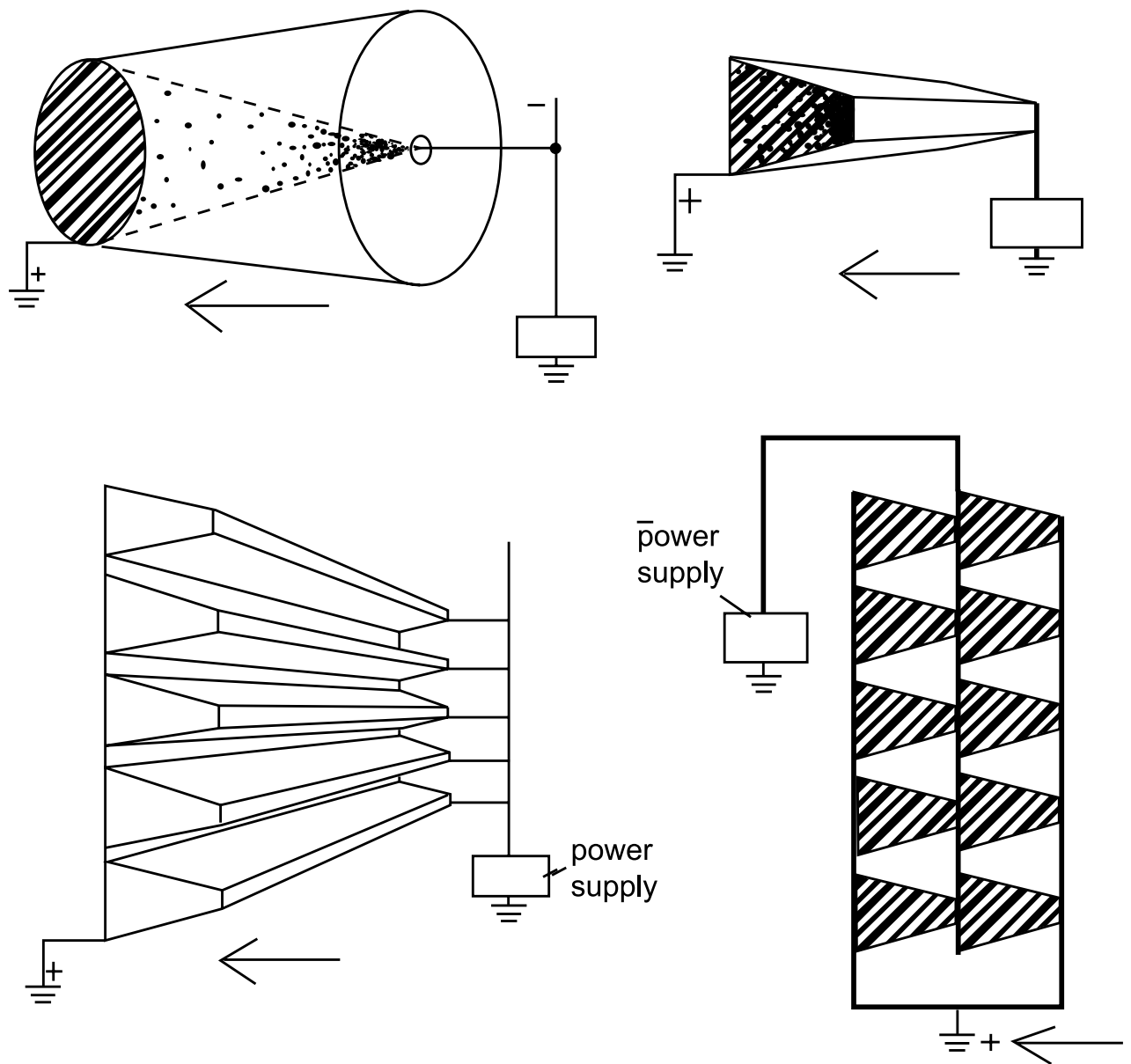
June 1, 1965

T. T. BROWN

3,187,206

# ELECTROKINETIK APPARATUS

Filed May 9, 1958



**Fig. 4**

Electrokinetic apparatus by T.T. Brown

Besides, there is the simplest example of creation of real work by means of potential field that is also resulting from the Brown's works. Usually two plates of electric capacitor are equal to each other. However, if one of the plates is small and another one is large then the electric field between them is not isotropy field and in this case there is some **gradient of intensity of the field**. In such field any dielectrical object, for example a ball, will be polarized unevenly and due to this fact some force should make it to be moving aside, where the field has the greater intensity. I have to note for mathematicians that since the intensity is "gradient of potential" then gradient of intensity is the **gradient of the gradient**, i.e. it is the second derivative of potential. This idea is an example of the well-known rule: the change gives the new quality.

The example of creation of the propulsion force by means of potential field is also connected with "perpetuum mobile" task, since conductivity currents in the capacitor are very small and it almost does not require power consumption (after being charged once time) and the system can produce mechanical work permanently, in this case it is the work against the gravity force. In general case, if the design allows asymmetrical energy transformations, then the surplus output power and reactionless propulsion force can be created in this system.

Most likely future aerospace systems, which are based on the electrogravity, are the most perspective direction of free energy technologies. Why not for the power engineering? It is clear that now there are some existing fuel heating systems, heat stations and power industry to provide by some traditional way all current needs of the society and due to this fact the innovation of any free energy technology is related with hard competition. However, for commercial programs for cosmos the reactive rockets principles are not acceptable more. Each satellite during its operation should produce profit to compensate large expenses for the rocket-carrier. Only fuel-less propulsion systems can allow developing space commercial programs that are new infinite market. Let's note that the gravitational (reactionless propulsion) technologies are not related with cosmodrome and their cost can be quite acceptable to realize the project with private funds.

***... future aerospace systems, which are based on the electrogravity, are the most perspective direction of free energy technologies.***

There are some known examples of free energy systems.

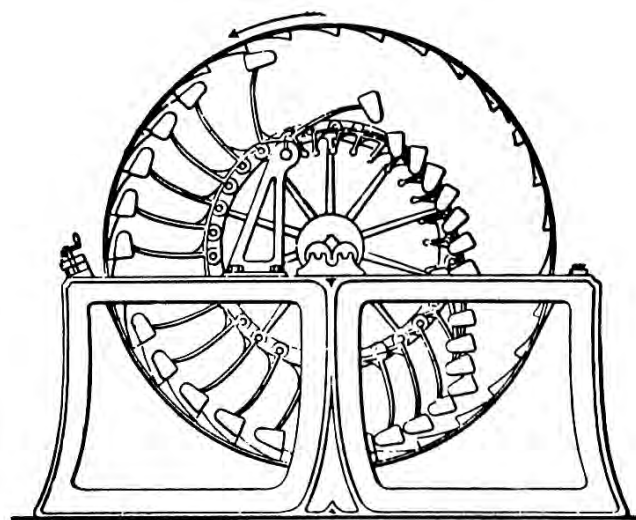
In 1921 The Seattle Times, as well as Denver Post of August 8, 1921 published the articles about inventions of Alfred Earl Hubbard. His device included the central core with coil and eight remote coils placed around the central core. After primary impulse, the impulses

in all coils were powered and rotating magnetic field was created in central coil. The power produced in the central coil was quite sufficient for self-excitation of the system and for producing of useful work in the load (motor). The boat and the car with electromotor, which was powered from the Hubbard's generator, were demonstrated.

In 1928, Lester Hendershot invented the electric generator of 300-Watts power. This device was designed of details used in radio-receiver to get oscillator (500 kilohertz) and non-inductive coil. Later, in 1970, William Cooper experimented with non-inductive bifilar coils. He used induction phenomenon in the case of zero magnetic component (two-wire winding or flat spire coil).

The Cooper's USA patent 3610971 of 1971 describes **the principle and the device to create power in secondary circuit without reaction on primary circuit**, as well as method to get reactionless propulsion force for aerospace application. Cooper also has found that specially designed coils can produce the field, which can not be screened and this field has some common parameters with the gravitational field.

The gravitation is considered by Cooper as a polarization of atoms in gravity field of planet. So he declares in description of his patent: "the electronic generator... of super high frequency creating the pulsing electric field of single polarity... acting in opposite direction to the Earth gravitational field... that to depolarized the atoms and to release them from the gravitation".



**Fig.5**

By the way, the gravitational field itself can be used to get a power. "Unbalanced wheel" is a well known design. The weights on the one side of the wheel, which is rotating in vertical plane, can be organized to be moving to axis, but on the another side the same weights can be organized to be shifted from the axis to the periphery of the wheel. By this way there is some



constant shifted center of gravity in the system and it can be permanently rotating system. One of the inventors who built such wheel is Hugo R. Fraga, Havana, Cuba (The Perpetual Motion Mystery. R.A. Ford, Lindsay Publications Inc., Bradley, IL 60915, USA, 1987, see Fig. 5).

The earliest information about such systems is dated of 1150 and the name of inventor is Bhaskar, India. He used the tangential disposed pipes, which were half-filled with water. In France (1235-1240) William de Onnecure demonstrated self-rotation wheel with seven weights. In Italy (1438) Mariano de Jacopo has built the system made of eight bars disposed in the plane of rotation, and the bar can be fold up in the middle like elbow joint to provide rotation. One of the well-known and documented events of real demonstration of perpetual rotation wheel was mentioned in 1620. Edward Somerset (Second Marquis of Worcester), author of the book "Century of Inventions", 1663, has built and tested the wheel of about 4 meters in diameter, 14 weights of 25 kilograms each. The test of this machine was organized in London, in witness of King Karl, Grand Duke Hamilton and Grand Duke Richmond, and there are files in royal archives about this test. The descriptions of these and other systems are published in the book "Perpetual mobiles: past and present time" by Brodiansky, Moscow, Energoatomisdat, 1989.



**Fig.6**

In different idea, which is known from Leonardo Da Vinci drawings, lifting of water is produced by the helical "Archimedes' screw" of small diameter with large centrifugal acceleration, which reduces weight, but lowering of water was organized with the screw of other (large) diameter, so the force of weight is working to rotate this screw by the weight of the falling water. The paradox of these systems will be removed if to consider them as systems of variable topology, as it was done at

the beginning of the present article. Practically, the **cycle is separated here into two processes** (the lifting and falling of mass) in the system with different parameters (the topology) for the first stage and the second stage of the cycle, but herewith **it is necessary to consider two different physical systems, not one and the same**. In that case, the classical theory can explain the work created by potential gravitational field of our planet as energy exchange between two different systems.

Other well known topic is research projects by John Searle, i.e. the "Searle's disks" (Fig. 6). It is necessary to note that the inventor mentioned in his articles anti-gravitational effect and free energy output also. The address is: John Searle, 13 Blackburn Lower Strand, Graham Park Estate, London MW9 5 NG, United Kingdom.

In several words we can say that rotor makes free electrons to be displaced to the peripheries of the system. With sufficient velocity it was mentioned that there is phosphorescence and ionization around the disk. It is possible to assume that main effect is based on well known Lorenz forces and understanding of the Poynting vector, which is circulating in this system. The ionization currents are closed through the space from periphery to the center, and self-rotation of the disk is provided by the classical Lorenz force, since the current interacts with magnetic field of the rollers.

In Russian experiments of 1992 Roshin and Godin built similar system of 7KWtt power output and they claimed that 100 kg axial force and areas of decreased temperature in environmental also were detected. Fig.7 demonstrates main parts of the system by Godin and Roshin.

It is necessary to note that similar anti-gravitational effects appearing for the case of over-unity operation were observed by different inventors independently. For example, in 1990 Floyd Sweet demonstrated his invention named as "vacuum triode amplifier" VTA. The barium magnets were pre-conditioned by special method to be used in special "trigger mode". This "bi-stable condition of magnet" provides possibility of transition from one direction of field to another direction due to the weak control signal, which was provided from external generator. It is known that if the material was pre-conditioned by the magnetic switching of 60 Hz frequency then its control signal must have the same 60 Hz frequency. A part of output power was closed to provide feedback and additionally some power can be used in output coil for the load. Tom Bearden studied the scheme of vacuum triode amplifier and confirmed that it demonstrates the work with negative energy. It means that the work in the load is connected with use of negative time. In this negative time, according to Bearden, the gravity is repulsing force. The experiments on VTA demonstrated that VTA decreased its weight according to level of the power, which is extracted from vacuum. Additionally we can

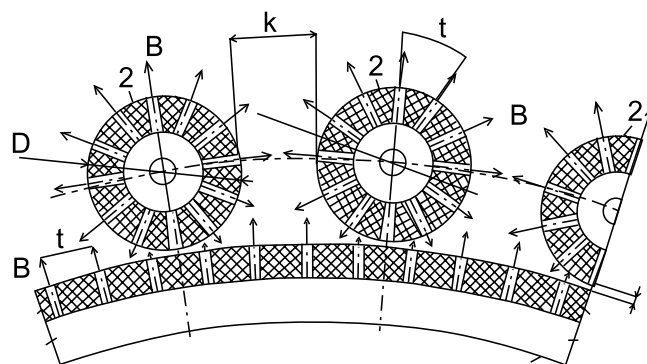
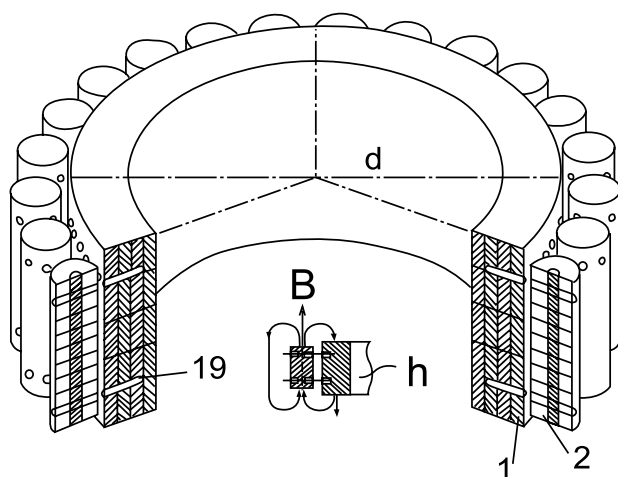


Fig.7

say that permanent magnets and coils of VTA were self-cooling during operation and the temperature difference was about 20 degrees in contrast with the environmental temperature.

One of VTA schemes includes two sets of magnets  $4 \times 6 \times 1$  inch, placed on two walls of frame. The attraction is created between them. Output and controlling coils are located between them. The axes of output coils are parallel to the magnetic field lines, but the axis of control coils are placed under 90 degrees angle. The secret of system is the "conditioning process", which "brings the magnets to the special condition". It is necessary to create great number of micro-cracks in the magnet due to re-orientations of magnetic domains. In such "half-magnet" the domains get the ability to be orientated in the same direction in a weak "control" magnetic field. In fact, they are not domains but large parts of magnet's material, separated by micro-cracks, that is to say acoustic domains. Many researchers repeat Floyd's works. Let's note that arc discharge of alternating current through magnet barium ceramics directly can provide the best results of the "conditioning" process. The coil of "conditioning" is not necessary in this case. The frequency of alternating current must be corresponded to the frequency of the control signal. Thereby, Sweet was creating **the bi-stable solid-state condition of magnetic substance**. The acoustic resonance is the reason of oscillations with the frequency according to the control weak magnetic field. Floyd Sweet died on July 5, 1995 at age of 83 years old. It is known, that his widow sent the archives to some great Automobile Corporation.

**... the extraction of space energy is result of transformation of vacuum energy but from the other hand the energy density in this case determines so called "time rate"**

It is interesting to note again that the magnets of VTA demonstrated self-cooling during operation, up to 20

degrees difference in comparison with the environmental temperature. It is one more example of relation between notion "density of time" and "energy". We can say that the extraction of space energy is result of transformation of vacuum energy but from the other hand the energy density in this case determines so called "time rate".

Kozyrev's articles [4] on causal mechanics theory and experiments describe possibility to use "time course for producing of useful work". Kozyrev introduced notion "density of time" and he demonstrated experimentally several methods how to change the density of time, which depends on irreversible processes intensity. Powerful "generator" of such processes is biosphere of our plane and it creates **season and daily changes of the density of time**. It is known that VTA power output also was variable in different time of day and night. It can be explained by Kozyrev. Next step in logical development of this idea is **to change notions from the "density of time" to "density of aether"** [10].

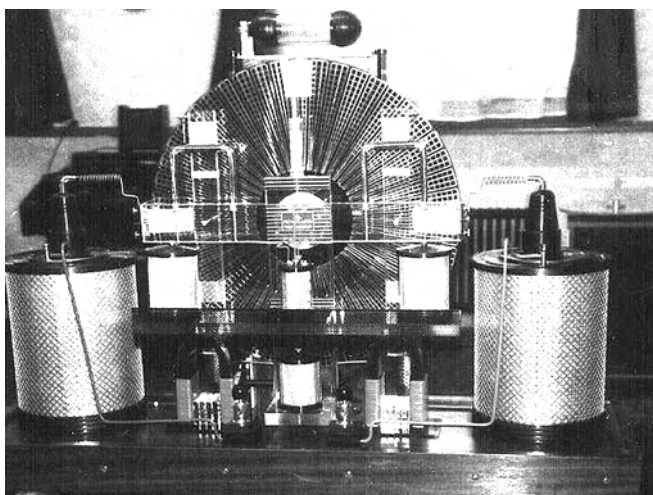
Relation between magnet phenomena and aether circulations was known from the beginning of the electrodynamics and now we can assume that VTA was real example of asymmetrical cause-effect connection, where the hardness of this connection depends on the density of aether. In this case the season and daily variation of the aether density are reason of VTA output power variations. So, we can make a conclusion: conception of **asymmetrical cause-effect connections** should be used as theoretical basis of all over-unity systems.

Generation of extra power in nonlinear materials (ferrites and dielectrics) was considered by Nikolay E. Zayev, Journal of Russian Physical Ideas, #1, 1991. Discovery was claimed as "Cooling of some dielectrics by changing electric field with generation of energy", Russia discovery #32-OT-10159, November 14, 1979; the inventions were also claimed as "Method of transformation of heat energy of dielectrics into electric

energy”, Russian patent claim #3601725/07 (084905), of June 4, 1983 and “Method of transformation of heat energy of ferrites into electric energy”, Russian patent claim #3601726/25 (084904), of April 3, 1983. This theory is not about some transformation of space-time structure but in any case the practical application of conversion of environmental heat is very important because this work is real basis of free energy systems.

In one of Zaev's articles, which were published in Journal of Russian Physical Ideas, he quoted from K. Zialkovsky: “If the heat can be transmitted from cold body to hot body, then it must have enormous importance, and not only philosophical or scientific, but also practical importance. The Clausius postulate is not confirmed in this case. The gravitational force, as well as other reasons (number of the reasons is unknown) break this postulate... heat can be transmitted from cold body to hot body but only as the result of some exclusive conditions”, published in Russian, “The Second beginning of thermodynamics”, Kaluga, Russia, 1914. So, the inventor of free energy system should provide this “exclusive conditions” to organize collection and transformation of environmental heat in his free energy system.

Another well-known free energy system is Swiss electrostatic machine. In spiritual commune Methernitha, Linden in Switzerland, since 1980 several free energy devices have been generating total power of 750 kilowatts. From the technical point of view, these devices are modernized electrophore generator. Permanent magnets also included into design of these devices. The machine of 20 cm diameter produces about 200 watts, and a big machine has the disk of 3 meters and it produces about 30 kilowatts, Fig. 8.



**Fig.8**

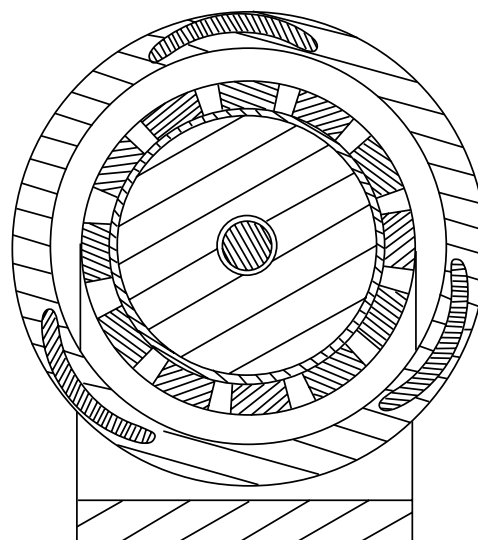
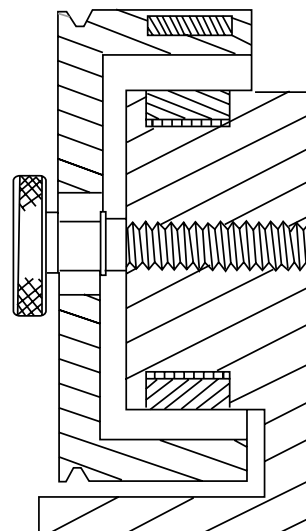
One of the modern technical decisions, which are very close to this Swiss machine is patent USA No. 4897592 by William Hide, January 30, 1990. This device is

“system to generate power from electric field”. It is one more example of work, which can be produced by potential field, in particularly by means of electric field that can be used as free source of power. The energy (the potential energy) is the possibility to produce work and the power is a work per unit of time, i.e. it is a process. The properly organized process, for example acceleration of rotor in Hide's machine, uses the potential field on the part of positive work (acceleration) and the author of the patent provides meta screen on the part of the trajectory, where the field decelerates the rotor.

**... it is “perpetuum mobile” and it can not be patented even if it really works!**

One more example is Reed's motor, which uses energy of permanent magnets. By the description of 1991 it is made of four disks (two immovable discs and two rotating discs), and eight magnets are placed on them. Howard Johnson used similar method, USA patent #4151431, Fig.9

U. S. Patent Apr. 24, 1979 Sheet 1 of 2 4, 151,431



**Fig.9**



Journal "Science & Mechanics" of 1980 describes this invention. Howard filled the application in 1973 but he has got the confirmation only in 1979! The reason of delay is very clear: it is "perpetuum mobile" and it can not be patented even if it really works! Johnson found clear and simple description of generation of power in his device and explained it as "extraction of power from inner energy of electron spin in ferromagnetic material".

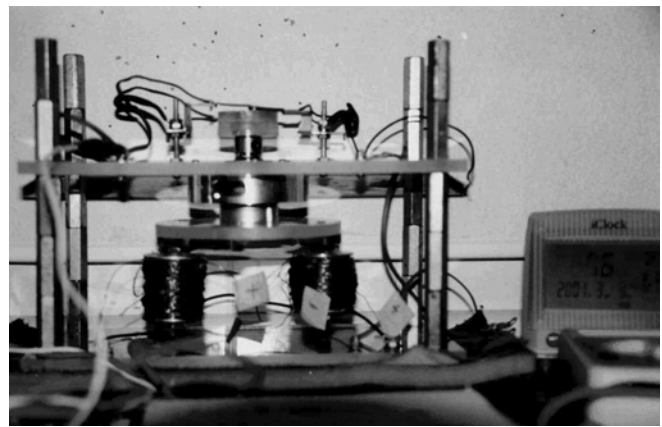
From text of his description it follows that USA patent #4,151,431 of April 24, 1979, "Permanent magnet motor", author Howard R. Johnson, application #422,306 December 6, 1973 was developed from the prototype that is USA patent #4,074,153 of 1978, class of international classification H02K 41/00E:

"The invention is directed to the method of utilizing the unpaired electron spins in ferromagnetic and other materials as a source of magnetic fields for producing power without any electron flow as occurs in normal conductors, and to permanent magnet motors for utilizing this method to produce a power source. In the practice of the invention the unpaired electron spins occurring within permanent magnets are utilized to produce a motive power source solely through the superconducting characteristics of a permanent magnet and the magnetic flux created by the magnets are controlled and concentrated to orient the magnetic forces generated in such a manner to useful continuous work, such as the displacement of a rotor with respect to a stator. The timing and orientation of magnetic forces at the rotor and stator components produced by the permanent magnets to produce a motor is accomplished with the proper geometrical relationship of these components."

***...conception of asymmetrical cause-effect connections should be used as theoretical basis of all over-unity systems.***

It is reported that functioning Johnson's model produced about 5 kilowatts power free of any primary source of energy. Let's note that Johnson writes in his patent about permanent magnet as about system with "super conductive parameters". The currents of electrons in permanent magnet are manifestation of real superconductivity and for this case it is not necessary to provide the cooling for zero ohmic resistance. Moreover, the "resistance" must be negative since the magnet could save and renew its magnetized condition. Thereby, any permanent magnet is the example of perpetuum mobile of the third kind on the micro level. Also we can say the same about each atom.

Also, let's note that in general case motion (rotation) can be created due to the discussed above gradient of field, which in Johnson's device is result of asymmetry in "rotor-stator" system. By the similar way the gradient of velocity of airflow above and below wing creates the gradient of pressure and this fact produces great lifting power in airplanes.



**Fig.10**

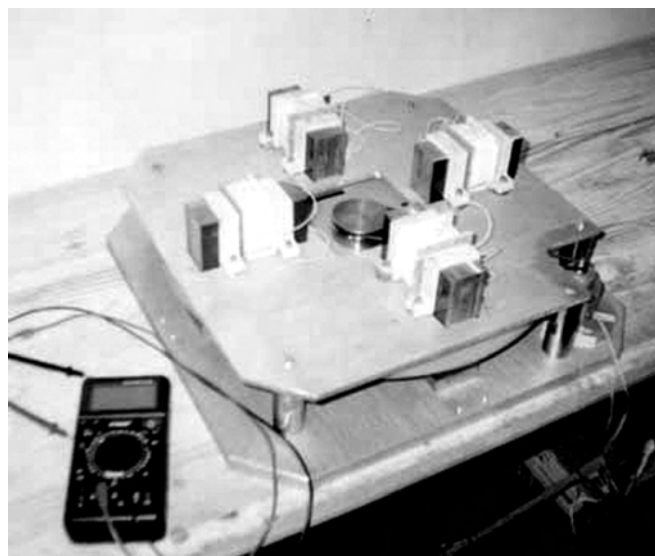
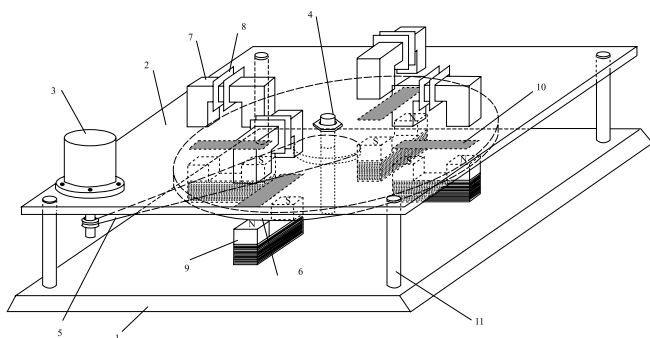
Well-known variant of permanent motor-generator is Adams motor, Fig.10. The rotor with radial orientated (the same pole outward) permanent magnets is rotating and creating induced currents in stator coils, which are placed around rotor in the plane of rotation. From the point of traditional electrical engineering, any motor-generator without closed magnet flux is not high efficient device. However, exactly open magnetic flux of the Adams motor allows to take off power without deceleration of the rotor. We can assume that in this case phenomenon of electromagnetic induction is not important but in this design there is magnetic induction only, i.e. magnetization and demagnetization of cores in the field of the moving magnet. It is a perfect analogy with phenomena of electric induction that is "electrization by influence". Similar "magnetization by influence" differs from electromagnetic induction and secondary magnetic field in winding of generator is not related with deceleration of the rotor. Robert Adams works with Harold Aspden under patenting of their system. Adams is more than 70 years old but from our correspondence with him we can say that he is going to build demonstration version of 10 Kwtt generator.

***...any permanent magnet is the example of perpetuum mobile of the third kind on the micro level.***

There is also special name "alternators" for this class of devices, which use interruption of magnetic flux, for example it is the device by USA patent of John Echlin #4567407.

The experiments to investigate the alternator principles were organized also by the author of this article and it was demonstrated that ferrite core of the generator coil is self-cooling. The simplest experiment is based on electro motor, which rotates iron plate and it periodically appears in the gap between magnet and coil. But it is necessary to note that change of the flux in the coil area should be organized by such a way to decrease the flux of the field in the rapprochement half-cycle and to increase the flux for the moving off half-cycle. In this case the

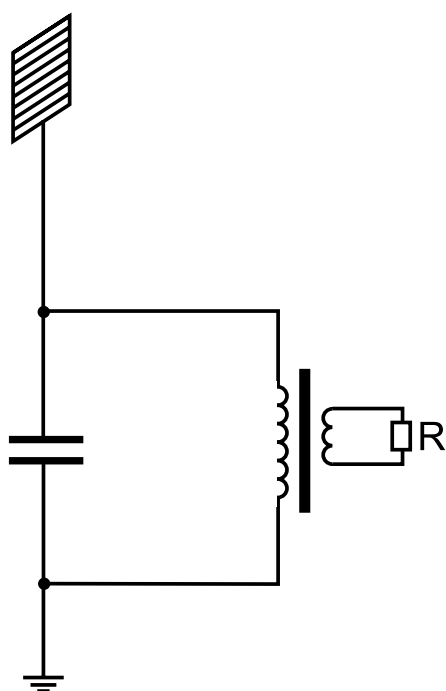
rotor is accelerated by the secondary field (back-EMF). From 1994 to 2003 several experiments were produced and main principles were claimed in the patent description, Fig.11.



**Fig.11**

One more topic is "extraction of power from air" and Josef Swenson has conducted the series of simple experiments to develop it. The frequency of natural pulsations of electric field of planet is about 7.5 Hz and it is well known from Tesla's age. Swenson works with frequency 375 kilohertz and antenna of 10 meters. Please, contact for more details: Josef Swenson 423 North 15th Street, Moorhead, Minnesota

56560, USA. However, everybody remembers from the school story about simplest electrical experiments by Lomonosov and Rihman, who investigated arc discharge in gap between iron wire from a roof ("antenna") and ground wire. Let's include the resonance circuit "inductance-capacity" and diode rectifier to get some useful work in the load "from atmospheric electricity", Fig.12.



**Fig.12**

In 1900-1930 a lot of articles were published in technical press about Henry Moray. His demonstration systems produced more than 50 kilowatts free power output. It is known that Mr. Yakovlev (from USSR Foreign Department headed by Mr. Molotov) visited Morey in November of 1929 in New York to test his devices. The devices consist of capacitors, coils and special electronic-vacuum lamps.

In 1990 journal "Magnets", 2 (3) published article, which describe analogy between Moray's devices and Hubbard's coils, which can extract power by means of inner energy of nucleuses of materials if special resonance is created. In 1978 Cospray Research Institute has published the well-known book "The Sea of Energy" by T. N. Moray, in which theory of Moray is presented most completely.

RQM Raum-Quanten-Motoren Corporation (Schmiedgasse 48, CH-8640 Rapperswil, Switzerland, fax 41-55-2125209) offers for free energy devices of different power level: RQM 25 kilowatt and RQM 200 kilowatt. The principle of work is based on an invention by Oliver Crane and his theory. Web site <http://www.rqm.ch>. But I have to note that in present time they are developing capitalization of the company

mainly (actives are above 650 million dollars) than innovation of the new technology.

One more historical example: in 1925-1945, Hans Koler demonstrated his free energy devices. The system was built in Germany and it produced 60 kilowatts of free power. The description includes six permanent magnets and coils, which were superposed in plane of hexagon form. Each magnet is core of the coil.

Another interesting topic is unipolar induction effect, which is well-known from Faraday. This effect creates electro motive force (EMF) in rotating disk if axial magnetic field is applied to the disk. One of the well-known practical developments in this area is device by Bruce de Palma. In 1991 he has published the results of his tests, from which it follows that deceleration of the rotor due to back EMF in the case of unipolar induction is less than in traditional electro generators. So output power of system can exceed the power, which is necessary to rotate the rotor.

Really, motion of electrons in magnetic field, which is perpendicular to plane of rotation, is the reason of the Lorenz force and this force acts in radial direction that can not be the reason of deceleration. Indian research on this topic is developing by P. Tewari. In New Zealand there is research group headed by Dr. Ashley Gray. In 1994 the leader of Japanese market MITI published report about progress in 40 KWtt unipolar generator, which uses superconductors for its electromagnets. The interest of Japan to alternative energy projects can be explained by the position of Japan on fuel market.

There is a well known rule: Demand is related with Proposals. It is easy to imagine the prospects of local introducing of free energy systems in one or several countries, if some producers of product will be able to exclude expenses on electricity and fuel from cost sales. Other countries of their own rich natural resources (for example, oil) will be in problematic position on the new international market, mainly due to the fact that their industry and transport are oriented to conversion and consumption of oil fuel that increase the cost of all products.

### ***... increase of the spark gap produces more surplus power in the load of the circuit.***

One more modern free device was invented by Wingate Lambertson, USA. In his device free electrons get the additional energy passing through the number of thin metal-ceramic composed layers. The units were designed by the authors and each unit can generate 1600 watts, and it is possible to connect them in parallel. The address of author: Dr. Wingate Lambertson, 216 83rd Street, Holmes Beach, Florida 34217, USA.

Especially the researches on free energy with plasma processes should be noted here. In 1980-1990 Alexander Chernetsky, Yuri Galkin and others have published the

results of experiments on creation of "self generated discharge" SGD. The electric arc was placed consecutively into secondary circuit of electromagnetic transformer and it produces real increase of power in load and reduction of consumption power in primary circuit of transformer. The author of the present article produced simplest experiments to investigate the arc (electric discharge) in electric circuits and possibility to create the mode of "negative resistance" in this circuit was confirmed. One of the effects was demonstrated in 1996 during the conferences "New Ideas in Natural Science", St.-Petersburg.

Adjusting parameters of arc (distance between two electrodes) it is possible to see that consumption current is decreasing until zero and then it can change its direction i.e. this system begins to generate the power. During similar experiment of 1971 by Dr. Chernetsky substation transformer in Moscow Aviation Institute was destroyed in result of strong "reversed current" impulse, which exceeded consumed power in 10 times more. According to Chernetsky's concept, the reason of this mode is well known phenomenon of plasma instability and **pinch-effect for great currents**. However, the author of this article tested device, which demonstrated similar effect (switching on the load in secondary circuit of transformer and in the presence of arc in this circuit, consumption power does not increase, but reduces) for small currents about 300 mA.

Since for pinch-effect it is necessary hundreds Amperes then it was offered another explanation: the surplus power in this circuit appears due to the acceleration of electrons in the gap between electrodes, i.e. particles of plasma are **accelerated by means of electric potential field between two electrodes**. It is noted during the experiments that increase of the spark gap produces more **surplus power in the load of the circuit**. To avoid mistakes the measurements of the consumed power were organized in DC (direct current) battery circuit and therefore there is no any reason to speak of phase shifts mistakes to try to explain skeptically this effect.

### ***... waves of density of time are used by organisms for their vital activity.***

Today theory and experiments on self-generating discharge are quite well developed to build free energy systems of any power scale. The reason of delay in its practical development is a complex problem: this work leaves the frames of classical physics. In his book "About physical nature of bio-energy and its simulation", Moscow, Publ. VZPI, 1989, Dr. Chernetsky considered the structure of biological fields and bio-energy processes in living organisms from the point of **longitudinal waves conception**. Self-generating discharge in the mode of negative resistance produces such longitudinal waves and they are self-sustaining (self-powered energetically) and it is considered as field of living object.

Really experimentators of the Chernetsky's group, who worked with SGD device detected influence of biologically active radiations and fields, which can be not screened by usual methods. It was reported by Chernetsky that parameters of this radiation can be selected to accelerate the development of plants and biomass or to suppress it. So, we should speak about artificial living biological system or biological form of energy for this class of free energy devices. Perhaps by the same plasma oscillation way all living organisms provide its vital activity, since long time ago it was known that metabolism and food can not provide enough energy for vital processes.

Nikolay A. Kozyrev also wrote about "reason of life" and he confirmed that waves of density of time are used by organisms for their vital activity. Between "waves of density of time" and "waves with longitudinal component" there is a clear analogy. Kozyrev and Chernetsky experimentally demonstrated methods of creation of such waves.

***...any free energy system should change the causality in surrounding space-time.***

New Energy News magazine, March 1996, wrote about attempts to innovate for American aerospace stations special power source, which uses similar plasma technology: anomalous electric discharge. The USA patents #5416391 and #5449989 belong to Dr. Paulo Correa and Dr. Alexandra Correa, Canada. In their report on free energy Denver conference it was claimed that efficiency is about 483%.

Let's note one more free energy topic: high efficient electrolysis. Classical electrolysis as decomposition of electrolyte in electric field is a wonderful example of work, which is produced by field and it can be organized by such a way to be free from the primary energy source (battery). The traditional scheme uses closed circuit of current through electrolyte and the battery, so the battery is discharged during the operation with electrolytic cell. However any physics textbook confirms that **ions in electrolyte are moving due to electric field only, i.e. work to organize the displacement of ions and heat power, which is connected with this work, are produced by the potential field and expenses of the primary power are not required.**

The current through the battery, which is created in usual closed electric circuit destroys the primary difference of potentials in the battery but it is not some necessary condition. For correct organization of the experiment the products of electrolysis (gases) can be created almost free and their utilization (burning) can provide more heat power than input electric power.

Prof. Latchinov, the real member of Russian Physico-Chemical Society, who patented his method of electrolysis in 1888, mentioned that in some cases the

electrolytic cell is freezing during its operation. This is an effect of the law of Conservation, which forces to return the surplus power by means of heat environmental energy. In the experiment by Latchinov the electrolytic cell can create gases of high pressure and consumed power is the same as for the case of low pressure gases. However, it is clear that high pressure gases can produce more work than low pressure gases do. This question was sensational problem in scientific societies of 1888 and it is not solved yet completely.

One of other variants of high efficient electrolysis was investigated by Igor Goriatchev, Russia. Instead of usual 3 Volts level of electrolysis, Goriatchev uses 0.2 Volt pulsing mode. He claimed ratio output/input as 1500% efficiency and he hopes to increase this value twice in more perfect design.

Professor Kanarev from Krasnodar wrote about his experiments on plasma electrolysis and has proved that in electrolysis of water output power can be more than input power.

Real example of "perpetuum mobile of the second kind" is invention by Russian engineer Albert Serogodsky (Moscow) and German engineer Bernard Sheffer (Berlin). They have patented new system for direct transformation of environmental heat into electricity, Germany patent #4244016. Retro-condensation of mixture of benzine and water is organized in closed system under temperature of 154 °C degrees. You can try to get more info from: Werkstatt fur Dezentrale Energieforschung, Pasewaldtstrasse 7, 14169 Berlin, Germany.

The fundamental theoretical researches on direct transformation of environmental heat to useful work were provided by Real Member of The Russian Physical Society Mr. Gennady N. Buynov, St.-Petersburg. The description of his project on "The Mono-thermal device" was published in journal "Russian Ideas" #2, 1992.

In 1995 the scientific journal of Russian Physical Society #1-6 published article "Perpetuum mobile of the second kind (paired gas-chemical cycle)". The author Gennady N. Buynov proposed to consider that **entropy function can be abortive**, i.e. it can be undetermined in some place if reversible chemical reactions are presented in the system.

***Herewith, the circular integral of entropy is not a zero and in this case the heat function but not entropy function (according to the Gess law) becomes the function of condition.***

Buynov offers to use four-oxide of nitrogen as working matter for this cycle. His works are excellent example of scientific enthusiasm, which (in combination with financial interest of the customers) could produce real results for Russia many years ago. Let's note that



priority of this discovery belongs to Russia in spite of attempts of other scientists to claim and develop this idea now as their own work.

We can make a very interesting conclusion if we analyze history of so called "cold fusion" discovery. According to de-classified materials of 1960, priorities of Russia in this topic are obvious. In 1989 Pons and Fleischman have reported about results of their experiment. In 1995 Russian Journal "Inventor and Rationalizator", #1 has published article about invention made by Ivan S. Filimonenko that was named in 1957 as "warm nuclear syntheses". In 1957 he detected **extra power output in process of heavy water electrolysis** and he mentioned several applied aspects, for example, propulsion force and possibility to reduce radioactivity by means of this process. In 1960 Kurchatov, Korolev and Zhukov have supported the ideas of the author. Russian Government adopted secret resolution on this work:

1. Investigation of energy generation.
2. Development of propulsion without reactive mass flow.
3. Research on protection from radioactivity.

But in next several years this work was suppressed by people of nuclear power plant team. The only system of such type named as TOPAZ was innovated for Russian aerospace systems. World-wide innovation of this technology is a real way to introduce "warm reactors of syntheses" and it is not necessary to wait for results of high-cost "Tokomak" project and other thermonuclear researches. Let's note that secondary effects (propulsion force and influence on radioactivity) are possible due to using of "free energy" aspect if output power is result of change of space-time parameters.

In 1994 Journal "Russian Ideas", #1-6, it was published an interesting document "Conclusion of The Moscow City Council Commission on the question about Ivan Filimonenko's discovery and its development". In this document it was recognized that it is vitally necessary to renew this works. But in 2003 we still have nothing new on this topic. Why? It can be assumed that the Problem of innovation for this technology is possible military application of the methods since influence on radioactivity (for example, remote reduction of radioactivity of some object) is area of interests of the Defense Department. The fact that energy generators by Filimonenko can be used for quick restoration of the present ecological balance is not so important in this case. The same conclusion is about propulsion method, which was proposed by Filimonenko. Mr. Korolev knew about this method; however present space programs are still based on rockets and reactive principles, and anti-gravity flying machines we can see only in fantastic movies.

At the same time, development of commercial cold fusion projects was started in some countries, for

example: Patterson Power Cell is introduced in Texas, USA (Clean Energy Technologies Inc., Dallas, Texas, fax 214-458-7690). More than thirty patents were owned by ENECO Corporation, which is collecting the main technological solutions in this area. The production of electrolytic thermal cells was started by Nova Resources Group., Inc., Colorado.

In August of 1995 Atomic Energy of Canada, Ltd. Company, which is member of The Planetary Association for Clean Energy, has published the review on modern methods of conversion of nucleus wastes and deactivation. Two new technologies were offered for introduction: contact processing by "Brown's gas" and remote processing by scalar (torsion) fields. Let's note that the technology proposed by Canadians and Filimonenko's technology demonstrate the effect of influence on the rates of radioactive decay.

These examples are only small part of real situation. Main references on publications are foreign and it can lead to wrong conclusion that Russia is delayed in this direction of new technologies development. In fact, Russia has more talented inventors and researchers than any other country. However, condition for work, patenting and publications of ideas are not the same, and usually Russian technologies cannot reach the level of international market. This problem depends only on real and official state policy with respect to inventors and scientists. In real life financial support of scientific institutes is mainly subsidy for management of the institutes, but not for science. The inventions and discoveries always were made by a certain real person, but not by Institute or some scientific team.

In Russia of last age and in the other world on the whole the institutes and laboratories have been creating for a new scientific problems, discoveries or new directions in science. It was necessary to claim about discovery and provide priority for own country to get official support. Main schools of thought appear by this natural way. By the same natural way the necessary in existing of some scientific institute can be removed when the idea grows up to serial production stage. If there are no any fresh ideas in this school then the institute should be transformed in design office of the production plant on this topic. It is almost impossible to create a new research institute in modern Russia, so really new ideas (if they are not ranged in frames of some existing scientific directions) can not be developed and they can not create a new school of thought in Russia.

***... it is possible to make a conclusion about grandiose misinformation of society...***

People (carriers of the new ideas) have to leave Russia to realize their sensational ideas on free energy and antigravitation topics. Why they do not work with Russian Academy of Sciences? It is the

rhetorical question. Usually after many years of correspondence with patent office or with official science bodies the authors can find that their ideas are published in "serious scientific magazines" but without any respect to their names...

Attachment 1 presents some information about patented technologies. When we study old and modern patent documents, it is possible to make a conclusion about **grandiose misinformation of society**, which leads to appearance of two different Worlds, separated by the level of knowledge: evident and hidden knowledge. The achievements of the second hidden world could change our planet, give a chance to remove all energy and ecological problems. Besides, we have discussed that some free energy systems (for example, self generated plasma discharge) have also the medical-biological aspects. This "influence" from free energy system is related with negative entropy processes in area of the operation of the system so some components of biological systems can be changed to less entropy. The design of free energy system defines the type of this influence. It was noted before that operation of any free energy system should be considered in high topology space-time as multidimensional system to see what the reason of the effect is.

So, since the rate of time course is determined by Nikolay A. Kozyrev as rate of cause-effect transformations, then any free energy system should change the causality in surrounding space-time. In this case we can assume that it creates quantum physics effects on the macro level. It is interesting to assume Heisenberg's uncertainty, tunnel effect and manifestation of wave characteristics (up to diffraction of objects) for macro level.

Some experimental data by Kozyrev is related with quantum effects, which were detected in his experiments with rotating and vibrating gyroscopes. This technology is the basis to design real teleportation systems, which will change parameters of space-time to allow changes of position of some material object from one point of space to another point of space (without transference on the distance between these points) by means of combining these points in the same place of space for some time.

The process of study of new technologies in alternative power industry and gravitation is developing actively in the world. Besides secret programs and institutes, it is possible to make a conclusion that activity of this work in countries of limited fuel resources is more efficient. Now Russia has rich **natural materials and oil resources but in the short time this advantage will not play any role in development of economy.**

***Industrial and defense power of any country will depend on free energy technologies, knowledge on the biologically active energy and reactionless propulsion methods.***

The new technology creates not only a new technical systems but also **new economical systems**. It is not physics but policy... Development of great Russian territories with industry of free energy technologies for home and commercial application is the way to change world economical balance in favor of Russia. It is difficult to say now what financial-economical group of modern Russia is most interested in development of this direction of science. The purpose of any financial-economical group is power on the market of energy resources, but when the free energy technologies are developing, then people and industrial or agricultural producers will be more independent from centralized system of energy and oil distribution, therefore, they will be more independent from influences of central authorities.

From the point of view of serious business, there is only one real argument in favor of developments of any really new technology: it should lead to increase of profit and expansion of the market. In this sense, it is possible to compare the new energy technologies with beginning of the steam machine age or with appearance of electric machines and illumination. This means the super profits and serious fight with competitors. To develop this way any efforts of scientists are not sufficient work. It is necessary to join them with the efforts of large business structures, which are interested to create new market of energy and power engineering in parallel to present monopoly fuel-energy market or to develop commercial exploration of space by means of new propulsion principles. In particular, telecommunication space satellites and projects on colonization of space could be the nearest commercial directions of the new market.

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### **Attachment 1**

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## Attachment 2

### Organizations

- Faraday Lab Ltd, Lev Tolstoy Str. 7, St. Petersburg, 197376, Russia.
- The Russian Physics Society, 141002, Moscow reg., Mytishy, B. Sharapovskaya str. 3. Fax 095-2926511
- Academy for Future Sciences, P.O. Box FE, Los Gatos, CA 95031, USA.
- AERI, Advanced Energy Research Institute, 14 Devonshire Mews West, London W1N 1Fp, Great Britain.
- ADAS, Association of Distinguished American Scientists, P.O. Box 1472, Huntsville, AL 35807, USA.
- Borderland Sciences Research Foundation, P.O. Box 429, Garberville, CA 95440-0429, USA.
- Center for Action, P.O. Box 472, HCR 31, Sandy Valley, NT 89019, USA.
- Electrodynamics Gravity, Inc., 35 W. Tallmadge Ave., Akron, Ohio 44310, USA.
- Fusion Information Center, P.O. Box 58639, Salt Lake City, Utah 84158-0369, USA
- Gravity Power Research Association, 36 Mountain Road, Burlington, MA 01803, USA.
- GRI, Group Research Institute, P.O. Box 438, Nelson, New Zealand. Dr. Ashley Gray.
- High Energy Enterprises, P.O. Box 5636, Security, CO 80931, USA. Fax 719-4750582.
- Institute for Advanced Studies at Austin, 4030 Braker Lane W., Suite 300, Austin, TX 78759, USA.
- INE, Institute for New Energy, 1304 South College Avenue, Fort Collins, CO 80524, USA.
- Integrity Institute, 1377 K Street, NW, Suite 16, Washington DC, USA. Fax 202-543-3069.
- Orgone Biophysical Research Laboratory, Inc., P.O. Box 1395, E1 Cerrito, CA 94530, USA.
- Quantum Biology Research Laboratory, P.O. Box 60653, Palo Alto, CA 94306, USA.
- SEA, Space Energy Association, P.O. Box 11422, Clearwater, FL 34616, USA.

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- ENECO Inc., 391-B Chipeta Way, Salt Lake City, Utah 84108, USA. Fax 801-5836245.
- "Robert Adams and Company" 46 Landing Road, Whakatane, Bay of Plenty, New Zealand. Robert Adams,
- Methernitha, 3517 Linden, Switzerland. Manager Francis Bosshard.
- Swiss Association for Free Energy, P.O. Box 10, 5704, Eggliswili, Switzerland.
- Space Research Institute, Box 33, Uwajima, Ehime 79, Japan. Dr. Shinichi Seike. Fax 895-24-7325.
- Nuclear Power Corporation, 581 400 Karnataka, India. Project Director Dr. Paramahansa Tewari.
- Cosmic Energy Foundation, Neptunuslaan 11, 3318 E1 Dordrecht, Netherlands. Dr. Martin Holwerda
- Sabberton Research, P.O. Box 35, Southampton S097BU, England, Dr. Harold Aspden.
- Labofex, Experimental and Applied Plasma Physics, Ontario, Canada, Dr. Paulo N. Correa.

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# Some General Properties of Matter and Energy Sources



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## Introduction

Nowadays there are appear more and more attempts to disclose new methods of obtaining energy from the ambient space, i.e. from heat, electromagnetic, gravitational fields, physical vacuum, aether, etc. (See, for example, publications in New Energy Technologies [1-3]). The publications demonstrate that researchers meet various incompletely investigated physical processes. These scientific areas are difficult to be investigated. All this makes obstacles for development of works on creation of new energy sources. **In this work there is made an attempt to demonstrate general properties of energy sources of any physical nature. This attempt is based on a general analysis of properties of matter.** A theory of transformers is used to investigate general properties of matter.

Action of all physical, technical and biological systems is expressed in energy transformation. Numerous theories based on particular (specific for some system) methods are applied for description of these systems. However, if the number of degrees of freedom and of elements inside a system increases then many theories are not able to describe operation of the systems. First these problems appeared in electrical engineering, radio engineering, automation and acoustics. The theory of transformers is applied to these fields of science. The theory represents a complicated system as a "black box" having several inputs and outputs. Operation of the numerous elements occurring inside the box is represented as some equivalent functions reduced to the inputs and outputs.

In the last decades methods of solution of mechanical dynamic tasks by the method of complex resistances are developed as well as representation of elements as linear transformers [11] and finite elements in liquid [14]. This tendency can be applied to the mechanics of

*Devoted to memory of Academician A.A. Harkevich*

liquids and gases. Now there are successfully developed those concepts which assume observation of models having very few degrees of freedom to be enough for analyzing processes in hydrodynamic systems [10]. However, a mathematical apparatus for description of transformers operation which is well-developed in these areas of science and engineering has a special view and is applicable only for these scientific areas.

Academician A.A. Harkevich developed a theory of a linear transformer up to the level of the general theory of transformers which is applicable for transformation of any types of energy [24]. The general theory of transformers proposed by A. A. Harkevich is applicable for description of various energy sources, flying and swimming objects, functioning of different animals' organs, and technological processes. In this work some general properties of matter and energy sources are investigated, according to the general theory of transformers.

## General theory of energy transformer

The whole ambient space, from the microworld to the macroworld, is filled with energy. According to different theories, space is represented as a compact medium (i.e. having distributed parameters) or a medium consisting of a limited number of discrete elements (i.e. having concentrated parameters). On the analogy of hydrodynamics [10, 14] the compact medium can be represented as an equivalent system with a limited number of degrees of freedom. Hence, the whole space can be represented as some system consisting of elements and communications between the elements with a limited number of degrees of freedom. Energy exchange occurs due to the degrees of freedom. Energy transmission occurs if energy gradient is presented in the ambient space. Due to the energy gradient a force tends to realize transmission in the space [4]. The elements can be systems as well.

Hence, the more we observe dividing the elements on the systems and the systems on the elements the more we will penetrate into the microworld (i.e. atoms, elementary particles, physical vacuum, aether, etc.). The more we combine the elements in the systems, and the systems in the new larger systems the more we observe the macroworld (the Solar System, galaxies etc.). All the systems and the elements are interconnected. The systems and their elements are

transformers of energy. Energy motion occurs in the smallest part of space. Consequently, the whole space can be represented as a system consisting of the energy transformers. In the general case due to every type of energy limits of a transformer consist of outer limits (i.e. communications with the macroworld) and inner limits (i.e. communications with the microworld). Dividing into the macroworld and the microworld occurs in relation to the size of a transformer for every type of energy. Types of energy coming through communications of a transformer and inside it may differ, i.e. mechanical, heating, electromagnetic, chemical and other known and unknown types of energy.

The processes in which a great number of interacting elements and different types of energy participate are very complicated and do not allow describe the processes accurately by modern mathematical methods. Hence, there is a problem to find such methods of solution of the tasks which without disclosing all the communications inside the element can give the understanding of the way an element moves in the system. The following premises can be made for the method of solution of the task of a system and its elements' motion:

1. Motion of all the elements in the space is characterized by energy exchange occurring among them;
2. We are interested in a certain limited area for every individual type of energy. The chosen limited area will be called as **a transformer**;
3. The transformer has degrees of freedom both on its limits (sides) and inside it (inner degrees of freedom);
4. Further this limited area (the transformer) which has or is able to have a limited number of degrees of freedom (sides) at its limit will be observed;
5. Interaction between this transformer and the ambient space occurs only through these degrees of freedom (sides) by means of energy exchange;
6. Motion of energy between the elements of the transformer occurs according to its degrees of freedom inside the transformer. There can be a limited or unlimited number of degrees of freedom.
7. All the space is full of the transformers. All the transformers adjoin each other without gaps. Energy exchange between the transformers occurs through their sides which do not have a size but reflect general kinematical and dynamic characteristics of the energy transferred through these sides.

*Editor: The full variant of the article includes mathematical description of operation of energy transformers which is followed by these conclusions:*

- There can be any number of different types of elements having a corresponding number of degrees of freedom and any type of energy inside the transformer. However, on every side of the transformer a generalized force has the same value and depends only on change of energy according to this degree of

freedom. Therefore, two transformers are considered to be equal if the generalized forces (energy changes) on all the sides are equal. In this case it is not necessary for the inner structure of the transformer, number of inner degrees of freedom, and energy types of these two transformers to be equal. This is **a principle of equivalency of transformers at the equivalency of the forces acting at the sides of transformers**.

- In the general case the generalized force at any side depends not only on energy exchange occurring at this side but on energy exchange occurring among the sides or at other sides of the transformer. The generalized forces are produced by energy distribution in the space.

- A transformer is characterized by the fact that there are different types of energy at its different input sides (or the energy can be of the same type but having other characteristics of motion).

Resistances of the interaction provide information about physical properties of the transformer, in particular, about physical interaction between the sides. At that a number of inner degrees of freedom in this transformer as well as the reactions at the other sides do not play any role. Proper resistances of the sides and resistances of the interaction provide information about inner physical characteristics of the transformer reduced to equivalent values at the sides. Hence, it is possible to have two transformers having equal equivalent resistances of interaction for all the sides. However, according to their geometrical and constructional characteristics and types of energy, the transformers will be different. The resistances may be a function of kinematical characteristics (**a nonlinear transformer**) or of time (**a parametrical transformer**). Moreover, it can have constant values (**a linear transformer**).

**It is appropriate to consider physical properties of matter included in the volume of a transformer only due to resistances at the sides of the transformer.**

## Structure of the transformer

Every inner degree of freedom can be represented as a series circuit. By analogy with electric circuits [6, 7, 11, 16-18] the transformer can consist of various circuits. An unlimited number of degrees of freedom allows represent a transformer consisting of an unlimited number of chains. The circuits have series, parallel, or mixed junctions. A part of a circuit whose elements have the same generalized displacement is called as a branch. The branch can consist of one or several elements. A place where three or more branches are joined is called as a multiple junction. A circuit is considered to be a closed path including several branches and multiple junctions. All the elements of a chain connected in series have equal generalized displacement (as well as equal speed and acceleration). The generalized force acting on the

whole circuit is equal to the sum of forces acting on the elements of the series circuit.

The elements connected in series can be replaced by one element in such a way that the generalized displacement and the summary generalized force would not change. In the case of a parallel connection all the branches of the circuit are joined to the same pair of multiple junctions and are under influence of the same generalized force. Parallel circuits can be replaced by series equivalent circuit and vice versa [6, 7, 11, 17, 18]. Hence, a number of inner degrees of freedom and a quantity of chains may be decreased as well as increased. In this case resistances occurring on all the sides will be constant.

## Structure of the linear transformer

The simplest transformer is a one-side transformer having one inner degree of freedom...

If to the input of the transformer we deliver generalized displacement (or force) which depends on time as a pure sinusoidal signal then the linear transformer will have sinusoidal reaction of the same frequency. For the sinusoidal signal with fixed frequency the linear transformer (including a transformer having an unlimited number of inner degrees of freedom) can be represented as an equivalent transformer reduced to this input as one chain. An equivalent transformer placing at this input at other fixed frequency of sinusoidal disturbance will be represented as a chain having one degree of freedom but different values of chain elements.

If the signal at the input of the transformer is of complicated time-periodical form then it can be decomposed to Fourier series. Every harmonics of the Fourier series will produce its own chain. The general complicated signal will produce the complex chain consisting of compound sum of elementary series chains. This complicated chain consists of elementary chains interconnected in series or in parallel and combined in multiple junctions and circuits. The construction principles of this complicated chain can be based on methods of identification and synthesis which are well developed in electrical engineering, automation for linear and non-linear transformers [9, 12, 13]. These principles are formally useful for transformers which transform energy of any physical nature. Identification produces so much elementary chains as the number of inner degrees of freedom. Every elementary chain reflects motion by one inner degree of freedom. Physical analogy occurring among motions of different nature is actual here [11, 16, 18]. Values of the generalized masses, elasticities, dissipative and active elements can depend on kinematical variables (non-linear chains), on time (parametrical chains), or they can be constant (linear chains).

If a series circuit includes mass and elasticity then it will have resonant frequency. At this frequency

reaction of mass and elasticity will be absent in the summary reaction. It is equal to the fact that we will know nothing about the value of mass (and elasticity) and, moreover, about its presence at all. The mass can have huge value, but it will be absent for us. Hence, if we assume a transformer as an atom then the atom may include elementary chains having huge masses (much more than the mass of the Earth), but we will not know about it until we apply such frequency to the input which explicates this mass.

Any energy transformer including a transformer with distributed parameters can be represented as a system of elementary series and parallel chains connected in a certain way. A concrete transformer can have various types of these connections. All of them can be included into another combination of connections that is accompanied by change of values of masses, elasticities, dissipative and active elements. However, in this case equivalency of reaction should be fulfilled at a certain diapason of frequencies on all the sides of the transformer.

There is a special spectrum of resonant frequencies for every combination of connections of the transformer. There will be an unlimited number of degrees of freedom and, hence, an unlimited number of resonances for the transformer with distributed parameters (for example, an elastic nail, a compressible fluid having a limited size). Our influence on the transformer usually has a certain diapason of frequencies. As the result of a limited diapason of excitation frequency the transformer will represent a system having a limited number of inner freedom, even if the transformer has distributed parameters.

Values of equivalent elements depend on oscillation frequency. Moreover, according to known laws, several parallel circuits can be transformed into a series one and vice versa. Taking it into account the following conclusions can be made:

1. The generalized mass, elasticity and dissipative elements do not have constant values in nature. Their value depends on frequency of the process, i.e. they depend on the character of time-change of the disturbance acting on the transformer.
2. The generalized mass, elasticity and dissipative elements are products of time-space change of energy.

## Types of energy transformers

Transformers can be nonlinear, parametrical and linear. The transformer can be **active** (having an internal source) and **passive** (having an external source). The passive transformer can never be an energy source (by definition). A transformer can accept or transform one type of energy (monoenergetic transformers) or several types of energy (polyenergetic transformers). The polyenergetic transformer includes a mechanism and

corresponding elements and chains which allow transform one type of energy into another one. Fundamentally, all the transformers are polyenergetic transformers of energy, however many of them can be represented as monoenergetic ones since other types of energy participate weakly in them. Designing a transformer it is more convenient to put the energy source out the transformer. Let us further classify the passive transformers.

### **The passive transformers can belong to the following types:**

#### **1. Simple transformers**

In this case energy is produced at the output due to transformation of energy coming to the inputs into energy of another type or having other characteristics. The following transformation can serve as the example.

*An electric transformer:* resistance of one value comes to the input, and the resistance of another value comes from the output (a type of energy is the same).

*A furnace for combustion of fuel:* energy of chemical connections comes to the input and heating energy comes from the output (energy of radiation may be neglected).

*A Wind Generator, Hydroelectric Power Station:* kinetic energy of moving air or water comes to the input, and electric energy comes from the output.

#### **2. Energy intensifiers**

In this case a transformer intensifies energy coming to one of the inputs due to energy coming to the other inputs (or to the other input). Below there is an example for a *monoenergetic transformer*. Energy (an electric signal having certain parameters) comes to the input of a transformer, and the output energy has the same characteristics but it is more intensive. It can occur due to electric energy coming to the other input of the transformer.

A heat pump represents an example for a *polyenergetic transformer*. Low potential heat energy of the ambient space (air, water, ground) comes to the input of the heat pump, and electric energy from a power network comes to the other input. The output heat energy has value which is equal to the sum of the coming heat energy of the ambient space and electric energy coming from the power network through the electric engine of the compressor. The output heat energy exceeds energy coming from the power network by several times. The output energy is always lower than the sum of the low potential heat energy and the electric energy coming to the input. Hence, the output of a heat pump is always less than unit.

Efficiency of the heat pump consists in the fact that a consumer pays for electric power produced by power network only (use of the low potential heat of the

ambient space is free). However, the output heat energy is several times more than the energy which can be produced by the electric power coming to the input.

#### **3. Active oscillator**

An active oscillator is a device of a certain type. Energy of time-constant characteristics comes to its input, and at output there is energy of time-periodical characteristics. Energy with time-periodical characteristics can come to the input as well since these characteristics are not connected with the time-periodical characteristics of the output energy. The transformer can operate in a mode of an active oscillator if it has the following features:

1. Indirect connection as a series circuit: one of the outputs is connected to an additional transformer whose output is connected to one of the inputs of the transformer. The additional transformer provides certain changes of the input signal (time delay).
2. Energy comes to the input (it can be time-constant or time-periodical).
3. The transformer must have a certain type of non-linearity.

#### **Examples of the active oscillator**

*Internal combustion engine:* the indirect connection is the system of combustion, the non-linear element is the system of admission and exhaust valves, and the energy source is energy of chemical connections of fuel.

*Various electric generators:* all of them have the indirect connection, the non-linear element, and the energy source.

The active oscillators differ from the electrical intensifiers qualitatively. The difference consists in the fact that the active oscillator can operate and receive energy from the ambient space without additional energy coming to it (from a power network, for example).

Theorists and experimenters try to create a self-supporting self-organizing system in their works on creation of alternative sources. This fundamentally correct tendency requires using theory of active oscillators. There is the developed theory in electrical engineering, automation, and other scientific fields [25]. To simplify application of these theories it is necessary to use analogy between equal processes which take place in different physical fields.

#### **4. Rectifiers**

Time-periodical energy comes to the input of the transformer. The output energy has time-constant or practically time-constant characteristics. If the transformer has a non-linear element or elements of a certain type (a diode or a one-sided valve) then it can



operate in the mode of a rectifier. The examples are electrical rectifiers and pumps of a valve type.

## Properties of energy transformers

### General properties:

1. A transformer can transform energy of one type as well as transform one type of energy into another type.
2. The generalized kinetic, potential and dissipative energies are specific peculiarities of energy change in the space and time.
3. The generalized masses, elasticities and dissipative elements are products of energy change in space and time.
4. Values of the generalized masses, elasticities and dissipative elements (existing inside the transformer as well as reduced to the equivalent values on the sides of it) depend on a temporal character of changes of kinematical or dynamic disturbances. Values of the generalized masses and elasticities at the sides of the transformer are lower than the corresponding values inside the transformer.
5. Energy interchange between macrostructures and microstructures can occur through a transformer.
6. One area of space can "know" about another area of space through energy exchange only, i.e. through generalized dynamic and kinematical interactions. In the light of the fact that chains of different transformers can have similar physical properties (for example, an equal resonant structure) interference of these transformers seems to be possible including interference occurring at a great distance.

### Properties of the passive monoenergetic transformer:

1. Transformation of characteristics of the same energy type.
2. The output energy can be both equal or lower than the sum of energies coming to all the inputs. The sum of the output energies decreases due to dissipative losses occurring inside the transformer.

### Properties of the passive polyenergetic transformer:

1. One energy type coming to an input can be transformed into another energy type coming from the output.
2. The sum of energies of all the outputs can be equal to the sum of energies of all the inputs or less than it. The sum of the output energies decreases due to dissipative losses occurring inside the transformer. The output will always be lower than unit. If the energy coming from certain of the outputs (within the limits of one output) is considered as a positive effect then the output will be less than the mentioned value.
3. Energy of one and the same type comes to the input and from the output while other energy types can come from other outputs. This property can allow increase one type of energy coming from an output at the expense of the other types of energy coming to the inputs.

## Analysis

This article is aimed to provide general properties of the energy transformers and to analyze some problems of creation of renewed energy sources, according to these properties. There are made various attempts to design a renewed energy source which would produce energy without fuel consumption. In the light of the above mentioned results, the researches on creation of the renewed energy source may be represented by the following way. Energy can be produced from the macrostructures and the microstructures.

In the case of the macrostructure, energy can be produced by a simple transformer, an electric intensifier or an active oscillator. Methods of production of energy from the ambient space by means of simple transformers (thermoelectric and hydroelectric power stations, wind generators, etc.) are developed sufficiently by the humankind. Works on producing energy from the ambient space by means of energy intensifiers are on its initial stage. Heat pumps, which utilize low potential heat energy by means of Freon-compressor heat pumps, are successfully introduced. One of the perspective approaches is replacing such a heat pump by a vortex oscillating heat pump which does not contain Freon and a compressor [3, 5, 19, 22]. In future it will be possible to replace the energetic pump by a new energy transformer of the type of an active oscillator. In this case the energy source will always obtain energy from the ambient space without using additional energy from a power network. Energy sources of the type of the active oscillator are internal and external combustion engines, stream engines, etc.

In the general case a transformer can contain different energy types and has communications with **outer microstructures**. It should be noted that the outer microstructures can be included in the geometrical size of the transformer. Energy of this microstructure can be huge; hence, this energy can be obtained from them for a very long period of time. Atomic reactors can serve as an example for this fact. The types of energy in these microstructures can be represented by known types (electromagnetic energy, nuclear energy) and unknown types (whose numerous quantity can be considered). These energy types exist in the ambient space. However, almost all the transformers of energy produced by a human (except the nuclear reactors) do not interact with the energies, and we do not obtain energy from these microstructures.

The task of creation of a new energy source consists in designing such an energy transformer which could obtain energy from the microstructures and transform it into the type of energy which is needed to a consumer. In this case all the designed transformers will not have over unit output. Efficiency of these transformers will be defined by the cost of the energy produced by them. This energy depends on a ratio of

energy coming to one of the inputs (electric power) (for example, in heat pumps) to the output energy. If the output energy is much more than the artificial energy which comes to one of the inputs then this transformer can be very useful for a consumer.

New high effective energy sources are often claimed to be created. According to the observed facts, existence of such sources is practically possible. Nevertheless, realization of this source will depend on our knowledge of physics of the microstructures and methods of transformation of energy of the microstructures into such type of energy which can be used by a consumer. Physics of microstructures is investigated badly, and many types of energy are totally unknown. Therefore, modern scientists try to create the new energy sources at random. In this case the following results can be achieved:

1. The high effectiveness of an energy source (over unit output) does not correspond to reality.
2. The output energy of the energy source is actually higher than the input energy (the source of the energy intensifier type).
3. The energy source actually produces energy without artificial input energy (the source of the active oscillator type). It can occur if an inventor failed to recognize the source of energy coming from the microstructures. It can be connected with particular or total lack of exploration of physics of the microstructures. Moreover, the fact is caused by transcendent difficulty of disclosing energy sources from the macrostructures.

## Conclusions

It is principally possible to create an energy source whose output energy would be higher than its input energy (an energy intensifier) or an energy source which would produce energy without additional input energy (an active oscillator).

1. Various energy sources or transformers of energy of the macrostructures and microstructures can be designed.
2. Practical value of the energy source is defined according to cost of its output energy instead of the output value.
3. Designing new energy sources it is useful to consider them from the point of view of transformers. It is worth to define all the communications of the transformer and to state experimentally energy at all the accessible communications of the transformer.
4. Developing theories of sources it is expedient to use physical analogy and to take into account ready results of works on theories of transformers, chains, etc. of electrical engineering, radio engineering, automation and other scientific fields.
5. In the light of the fact that it is planned to obtain energy from the microstructures it is necessary to pay attention to new probable types of radiation and to their influence on a human.

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# Commercial Exploration of Space



## Review

by **Olga Leontyeva**, Editor

<http://www.faraday.ru>

Of late years the mankind has greatly advanced in space exploration. New spaceships are created, automatic apparatus are launched to the planets of solar system, space stations are orbited. A man has passed to outer space and begun exploring the planets of solar system. More and more specialists and people of different professions are involved in the development of space industry. However to present day only a few of them has succeeded flying into space.

At the present state of affairs space flight is very expensive and a serious reason should exist to forward a man into space if he or she does not relate to the aims of professional cosmonautics. However in last years there has appeared a certain breakthrough in the solving of the problem. Nowadays space technologies gradually turn from the sphere of experimental and scientific researches to the area of practical application. The time has come for a man to realize the real space flight without being the professional cosmonaut.

What are the ways to solve the problem? No doubt that special attention should be paid to the development of new space technologies, search of new types of fuel and attraction of investments to the sphere of space tourism.

April 28, 2001 can be considered as official date of birth of space tourism, when there was launched the space ship "Soyuz TM-32" with the first space tourist aboard. Almost in a year, on April 25, 2002 the space tourist #2 South African Republic person Mark Shattlword started on his space journey.

Today many companies give the opportunity to make a real space flight for all comers who have enough money and health. It is promised the providing of the most modern space technologies and the most perfect space equipment. It can be created a furor by the "Minimum program" of the Russian company "Atlas Aerospace" which is made by the members of Yu.A. Gagarin Center of training of cosmonauts.

In recent years at the international market there appear more and more companies which deal with search and encouragement of inventors who work on creation of

alternative propulsion systems. Activity of "X Prize Foundation" company can be considered as an example.

## The X PRIZE Foundation

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**The X PRIZE** is a \$10,000,000 prize to jumpstart the space tourism industry through competition between the most talented entrepreneurs and rocket experts in the world. The \$10 Million cash prize will be awarded to the first team that:

- Privately finances, builds & launches a spaceship, able to carry three people to 100 kilometers (62.5 miles)
- Returns safely to Earth
- Repeats the launch with the same ship within 2 weeks

The X PRIZE competition follows in the footsteps of more than 100 aviation incentive prizes offered between 1905 and 1935 which created today's multibillion dollar air transport industry.

For more than 30 years, the general public has waited for an opportunity to enjoy the space frontier on a first-hand basis. The X PRIZE Foundation is working to make space travel possible for all. The spaceships that compete for the X PRIZE are designed to carry passengers.

Since its inception in May 1996, the X PRIZE Foundation has registered more than 20 teams from seven countries to compete for the prize. The X PRIZE is fully funded through January 1, 2005, through private donations and backed by an insurance policy to guarantee that the \$10 million is in place on the day that the prize is won. Additional funds are still being raised by the X PRIZE Foundation to implement the competition (judging, media, event management, etc.) and continue the Foundation's education mission.

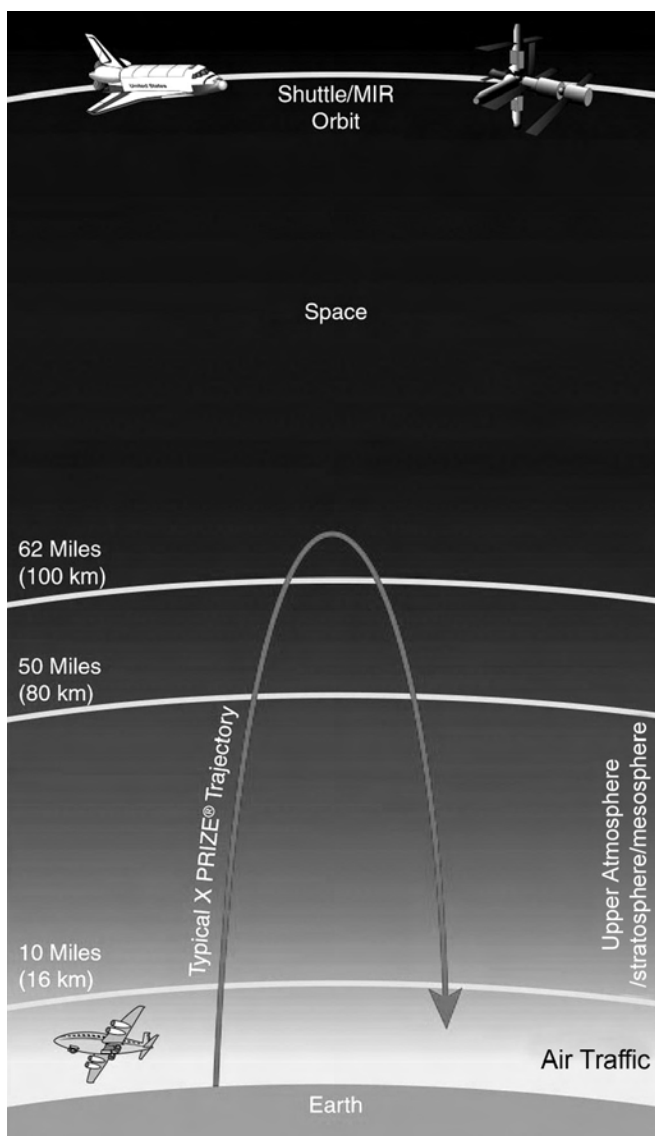
The X PRIZE was inspired by the early aviation prizes of the 20th Century, primarily the spectacular trans-Atlantic flight of Charles Lindbergh in The Spirit of St. Louis which captured the US \$25,000 (US\$) Orteig

prize in 1927. Through a smaller, faster, better approach to aviation, Lindbergh and his financial supporters, The Spirit of St. Louis Organization, demonstrated that a small professional team could outperform a large, government-style effort.

The Societal Benefits of the X PRIZE include:

- \* Creation of a new generation of heroes
- \* Inspiring and educating students
- \* Focusing public attention and investment capital on this new business frontier
- \* Challenging explorers and rocket scientists around the world; and,
- \* Vehicles built for the X PRIZE will eventually serve four different industries:
  - Space Tourism
  - Low-cost satellite launching
  - Same-day package delivery
  - Rapid point-to-point passenger travel.

In Fig. 1 it is demonstrated the typical X Prize trajectory.



**Fig. 1**

*Editor: Below we publish photos and brief comments about some official X PRIZE registrant teams. More detailed information you can find at <http://www.xprize.org/imagefacts/photo1.html>.*

## The Da Vinci Project

<http://www.davinciproject.com>



**Fig. 2**  
"Wild fire"

The **da Vinci Project** will launch its spacecraft ("Wild Fire") from the world's largest helium balloon. The 3,270 kg (7,200 pound) rocket will be tethered 720 meters (2,400 feet) below the balloon and lifted over the course of an hour to an altitude of 80,000 feet. The 10,000 pound thrust, liquid oxygen, kerosene engines will fire the first stage and the rocket will fly an initial angular trajectory to clear the balloon. The spacecraft then will transition to vertical flight to its apogee of 120 km in space. The rocket will reach a maximum speed on both its ascent and re-entry of Mach 4, or 4,250 kph (2,650 mph).

An innovative ballute will protect and stabilize the rocket on re-entry. A flyable parachute will be deployed at 25,000 feet and the rocket will descend under control, guided by GPS, to a predetermined landing zone. The da Vinci Project has already successfully conducted full-scale rocket motor test and has built a full-scale mockup of their vehicle.

## "Discraft" corporation

<http://www.xprize.org/teams/teams.html>

John Bloomer, the team leader, is an aerospace engineer and he has worked on many aerospace projects, including Apollo and holds more than 60 patents on a disc platform aircraft. Bloomer's ship utilizes "Blastwave" Pulsejets.

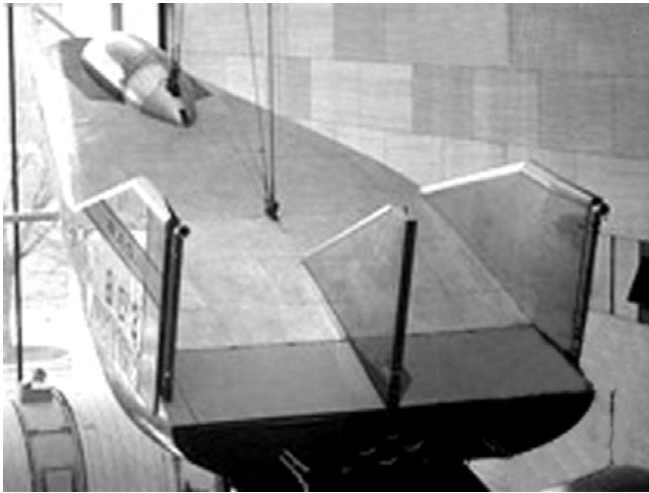


### Flight Sequence

Fixed, 7850-ft<sup>2</sup>-area, laminar-flow wing take-off at about 60 mph within about 150 ft, featuring climb with gradual air-breathing acceleration (according to a fixed program) at fixed angles, to exit the atmosphere at Mach 10 on an unpowered ballistic arc to reach 75-mi. altitude: return on down-leg of same unpowered arc to gradual power-on flare-out re-entry of the atmosphere in simple reverse sequence of the take-off velocity profile. Range above 100,000 ft is about 480 mi. which is covered in about 5 minutes.

## “Kelly Space & Technology”

<http://www.kellyspace.com>



**Fig. 3**  
“LB-X”

The vehicle is a rocket-powered delta wing glider with a liquid oxygen and kerosene liquid rocket engine. The spacecraft is prepared and fueled at the takeoff airport. The spacecraft is towed to release altitude behind a conventional jet powered aircraft such as Boeing 747 aircraft. Upon release from the tow aircraft, the main engine is throttled up for boost phase. The vehicle nominally coasts to an apogee altitude of 100 kilometers. The vehicle then glides to a landing at the takeoff airport for checkout and refueling prior to the next flight.

### Flight Sequence

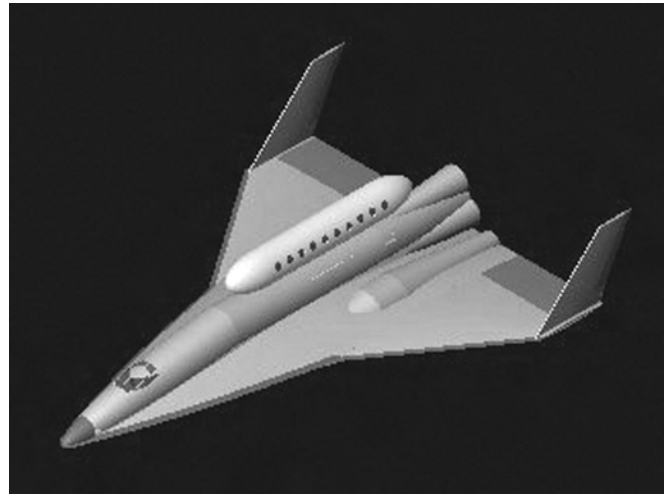
The lifting body will be towed to launch altitude behind another aircraft, and the rockets will be ignited. The craft will return to the landing site and make an unpowered, horizontal landing.

## “Lone Star Space Access”

<http://www.dynamicar.com>

The Cosmos Mariner employs air-breathing jet propulsion for take-off and landing from conventional

airports and rocket propulsion for ascent from cruise flight in the stratosphere to 30 or 40 nautical miles altitude. From there, the vehicle coasts to a target altitude of around 65 nautical miles. The air frame is designed to interface with two jet engines (turbofan or turbojet) each with 20,000-lbs static thrust or less. For rocket propulsion, the Cosmos Mariner will use the Aerojet AJ26-NK31A, a staged-combustion kerosene engine. The vehicle is designed to take off and land from conventional runways.



**Fig. 4**  
“Cosmos Mariner”

Along with X Prize Foundation it should be mentioned **ALLTRA** Company (Germany). ALLTRA consists of a small group of space experts. The main objective of ALLTRA is to ‘sell’ the space idea to a broad public and to identify future commercial opportunities in the space sector.

On the official ALLTRA website <http://www.alltra.de> you can find collection of artist’s views of the projects which are aimed at decrease in space ships value by means of using of new types of engines. Besides the Company deals with the development of space hotel projects.

## **JNET**

### **New Energy Technologies collection of articles Japanese Version**

Collection of articles from New Energy Technologies magazine, 2001-2002 is published in Japan.

### **On purchasing of the book, please, contact**

Eiichi Yamamoto,  
President Yama Trans Co. Ltd.

Email: [admin@yamatrans.co.jp](mailto:admin@yamatrans.co.jp) or  
[eyama@yamatrans.co.jp](mailto:eyama@yamatrans.co.jp)

# Alternative Aircrafts and Space Propulsion Systems

*Editor: Nowadays all over the world there are made numerous attempts to create new types of aircrafts and alternative space propulsion systems. Below we publish the review of some interesting devices which are presented in the modern market.*

## “Arbortech Pty.Ltd”

<http://www.airboard.com.au>



**Fig. 1**  
Airboard 2000

### General Technical Specifications

**Total payload, including rider** — 100 kg (220 lb)  
**Operating time** — 1 hour on full tank of fuel  
**Construction** — Fiber glass/High-impact plastic shell, Aluminum frame, Rubber skirt  
**Starting** — Electric key-start, Battery included  
**Engine** — Briggs & Stratton 4-stroke  
**Fuel tank capacity** — 5 litre (1.3 US gal)  
**Fuel type** — 85 Octane unleaded

### How does it work?

Airboard uses Hovercraft air cushion principles to glide just above the ground. The air cushion is generated from a purpose designed engine and fan which are suspended below the Airboard shell. In addition to providing an air cushion for the Airboard

to ride on the fan also provides a fast stream of air exiting from the rear of the craft to provide forward thrust – just like a hovercraft. To help provide better acceleration the Airboard also includes a unique friction drive wheel at the rear. When the rider wishes to accelerate forward, weight transfer is used to bring the friction drive into contact with the ground. By engaging the friction drive clutch the Airboard can be accelerated forward without losing the feel of hovering above the ground. The control of the Airboard is provided by weight transfer of the rider, similar to surfboards, skate boards and snow boards. In operation the Airboard can be started, stopped and steered in a controlled manner and this means that riders can perform stunts, trick maneuvers and race around tight tracks against each other. In this unique way the Airboard is the first ever vehicle to deliver the advantages of hovercraft vehicle without the disadvantages of poor acceleration and handling.

## “Trek Aerospace, Inc.”

<http://www.solotrek.com>



**Fig. 2**

Trek Aerospace

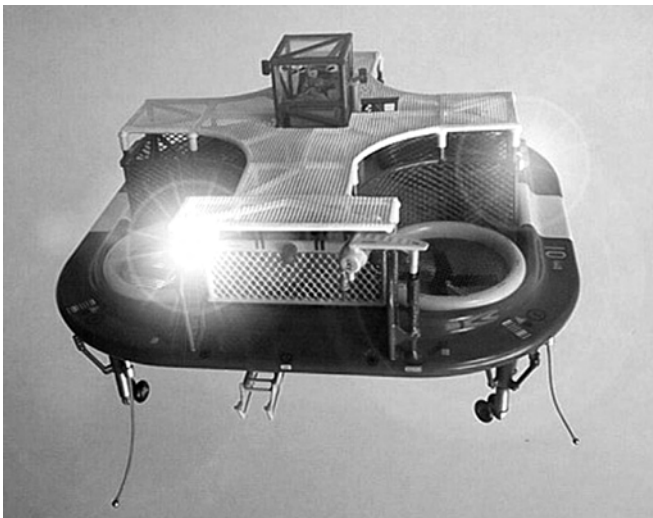
## Preliminary Specifications and Predicted Performance

Normal Gross Take Off Weight	800 Lbs.
Fuel (15 U.S. Gallons)	98 Lbs.
Mission Payload, net of fuel	352 Lbs.
Takeoff/Landing Distance	0 (VTOL)
Maximum Speed	70 Mph
Range	120+ Miles
Hover/Loiter Endurance	2+ Hours
Engine Type	Advanced Int. Combustion
Fuel Requirements	Heavy-Fuel or Gasoline

**Special Features:** 100% fly-by-wire control system with electronic stability augmentation; Intuitive, easy to fly safely; Minimal field service requirements; Rugged, efficient power train.

## DM AeroSafe

<http://dmaerosafe.freesevers.com>



**Fig. 3**

EAGLE vertical take-off and landing  
aerial rescue platform

DM AeroSafe is a small research and development team, which has developed a totally new high-rise rescue technology to retrieve trapped people from areas which cannot be reached by conventional aerial ladder, conventional helicopter or a helicopter equipped with a Heli-Basket.

This technology could give rise to a new class of air transportation means, used for safe close-in maneuvering around tall structures, even inside the highly populated areas.

## Eagle Aerial Rescue Platform's Performance Summary

### Dimensions:

Length - 42 feet (12.8 m)  
Width - 42 feet (12.8 m)  
Height - 16 feet (4.8 m)

### Weights:

Max. Gross weight - 5000 pounds (2268 kg)  
Payload (Crew of two plus 10 rescued people) - about 2000 pounds (about 900 kg).

### Propulsion System:

Four (4) variable collective pitch Ducted Propellers  
Propeller Diameter - 7.8 feet (2.4 m)  
Engines - four (4) four-cylinder radial piston aero engines with forced air cooling system 250 hp each (1000 hp total)

### Performance:

Max. Duration - about 5 hours without refueling  
Max. Airspeed - 40 knots (75 km/h)  
Max. operating altitude - about 7000 feet (about 2200 m).

## “LTAS/CAMBOT, Inc.”

<http://www.lvcn.com>

### Passenger Craft “Ltas 30-Xb”

The ships have rigid monocoque hulls, hybrid powered vectored thrust control and full active buoyancy control. (LTAS US Patent Pending).

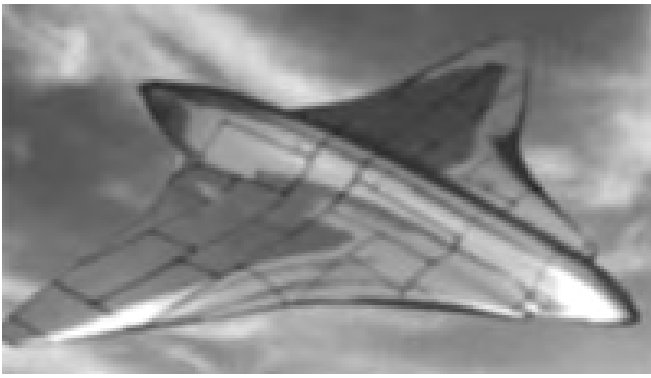
This small 2-3 person craft at 70 to 80 feet in diameter will demonstrate ALL production systems and is designed for the LTAS FAA Type Certification program.

## NASA's Langley Research Center

<http://science.nasa.gov>

NASA researchers are studying insects and birds, and using “smart” materials with uncanny properties to develop new and mind-boggling aircraft designs.

The “personal aircraft” that replaces the beloved automobile in people's garages may still lie in the realm of science fiction or Saturday-morning cartoons, but researchers at NASA's Langley Research Center (LaRC) are developing exotic technologies that could bring a personal “air-car” closer to reality.



**Fig. 4**

And air-cars are just the beginning! Self-healing wings that flex and react like living organisms, versatile bombers that double as agile jet fighters, and swarms of tiny unmanned aircraft are just a few of the science-fiction-like possibilities that these next-generation technologies could make feasible in the decades ahead.

## **Laser Beam Flight**

### **Lightcraft Technologies, Inc. (LTI)**

<http://www.lightcrafttechnologies.com>

Lightcraft Technologies, Inc. is a new company committed to providing low-cost access to space through the use of beamed energy propulsion. (See color photos on the cover page).



**Fig. 1**

In 2000 at the High Energy Laser Systems Test Facility (HELSTF), Lightcraft Technologies, Inc. (LTI) set a new world's altitude record of 233 feet (71 meters) for its 4.8 inch (12.2 cm) diameter laser boosted rocket - in a flight lasting 12.7 seconds.

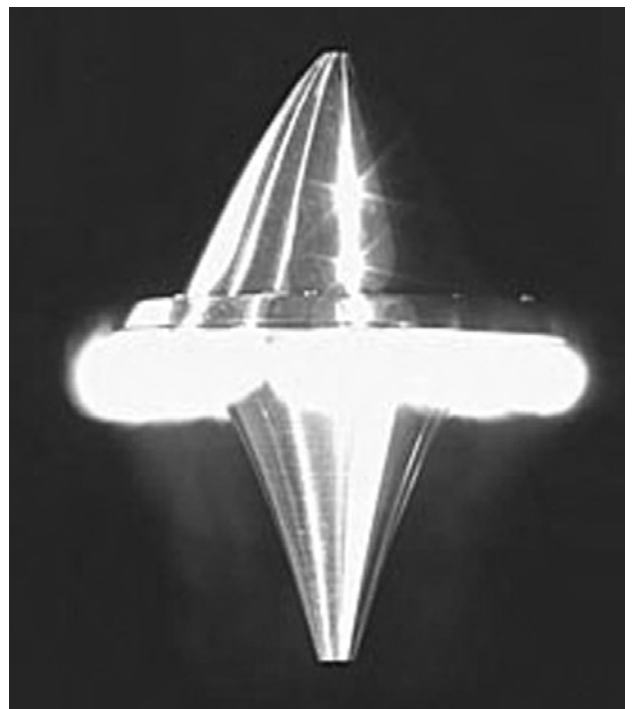
Although much of the flight was spent hovering at 230+ feet, the Lightcraft sustained no damage and will fly again. Besides setting the new altitude record, the craft demonstrated the longest ever laser-powered free flight and the greatest "air time" (i.e., launch-to-landing/recovery). LTI launched a total of seven vertical flights between 8:30 am and 11:30 am with three Lightcraft weighing less than 1.8 ounces (51 grams). Two of the flights by Lightcraft #3 reached 159 and 184 feet with the same propellant load!

***...set a new world's altitude record of 233 feet!***

The record flights were powered by the 10 kW pulsed carbon dioxide laser named "PLVTS" by the organization that owns it: the Directorate for Applied Technology, Test and Simulation (DATTS). Even though PLVTS was suffering from an arcing or grounding problem that caused it to run erratically, the laser power was still adequate to propel the craft to record altitudes.

### **What is a Lightcraft?**

A Lightcraft is a 1kg launch vehicle, made from high temperature ceramic materials, that flies into space on a megawatt laser beam.



**Fig. 2**

The Lightcraft is both a single-stage-to-orbit launch vehicle and a satellite. If you have any further questions or comments, write or call LTI headquarters in Bennington, VT. The company representatives would be delighted to send you more information, or answer any inquiries over the phone.

## How does it work?

A ground based laser is the power source that propels the Lightcraft into orbit. Lightcraft can deliver payloads into space for a fraction of the cost of traditional rockets because most of the engine stays on the ground, thereby unburdening the craft from having to lift the energy source for its propulsion system.



**Fig. 3**

The back side of the craft is a large, highly polished parabolic mirror that is designed to capture the laser beam projected at it from the ground. The mirror focuses the beam, rapidly heating the air to 5 TIMES the temperature of the sun, creating a blast wave out the back that pushes the vehicle upward. As the beam is rapidly pulsed, the vehicle is continuously propelled forward, on its way to orbit.

## History of Lightcraft

1987 — Prof. Leik Myrabo invents Lightcraft for SDIO.

1997 — First successful wire-guided tests at WSMR. Solved flight stability difficulties, much like the Wright brothers did with the airplane.

1997 — Lightcraft broke Goddard's 41 ft., 1926 first successful rocket flight - but this time with no on-board fuel.

1998 — Record flight of 99 ft. with air breathing Lightcraft engine.

1999 — Record flight of 128 ft. with first rocket Lightcraft engine.

2000 — LTI sets new world record for highest flight (233 ft), longest flight time, and heaviest vehicle.

## How can LTI reduce launch costs?

**Conventional Launch** — \$175,000,000

**The Lightcraft** — \$46,000

### Chemical Rockets:

- carry massive propulsion source on board
- are expendable
- extremely costly
- prone to explosion due to fuel on board

### Laser Propulsion:

- propulsion energy source remains on the ground!
- Lightcraft are inexpensive to manufacture and extremely light weight
- highly reusable power source is never subjected to the risks of flight

### Lightcraft Technologies, Inc.

1914 Walloomsac Rd.  
Bennington, VT 05201  
Office: 802-447-6275  
FAX: 802-447-8216

E-mail: [tmyrabo@lightcrafttechnologies.com](mailto:tmyrabo@lightcrafttechnologies.com)

## Alternative space propulsion systems Star Drive

**Mark R. Tomion, USA**

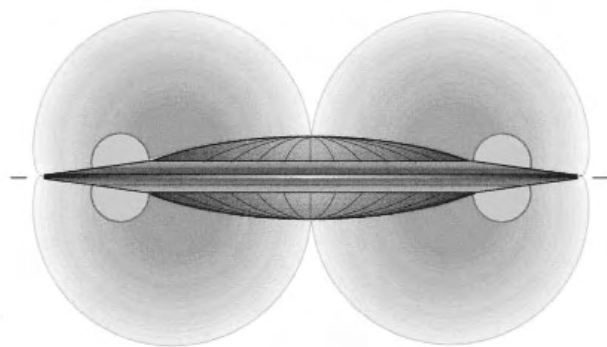
<http://www.stardrivedevice.com>

Re: U.S. Patent **6,404,089** for the **Electrodynamic Field Generator, (EDF)**,

issued June 11, 2002 to Mark R. Tomion.

The 'official' name of the "StarDrive device", per the U.S. Patent and international PCT Applications, is **Electrodynamic Field Generator**. The EDF Generator uses banks of permanent magnets and rotating Field Coils to produce a very-high DC rotor voltage, and plane-parallel ring electrode arrays to electrostatically expand and control that voltage *as applied to the hull*, so that huge quantities of external Field electrons may be accelerated to energy levels that are usually reached only with a particle accelerator! It's somewhat like a glorified arc welder whose output is deliberately shorted to its own housing, and the DC voltage and current across the emitter and collector housing sections can be thermionically increased to values that are generally observed only in lightning: but the Field's *current density* is limited to a value which falls short of damaging the hull!



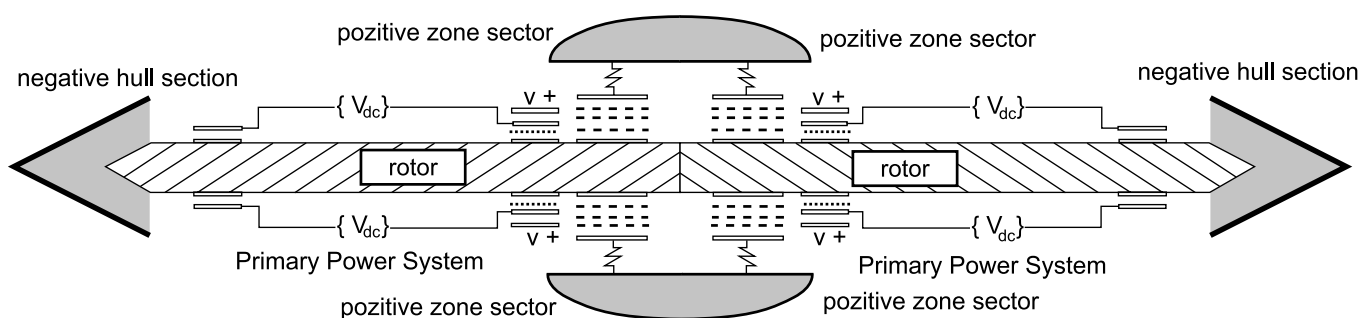


**Fig. 1**  
StarDrive device hull & electrodynamic  
Field configuration

As depicted above (Fig. 1), electrons circulating in the external Field envelope can achieve an impact velocity at the central collector sections which is very nearly that of light, and applied magnetic fields allow broad modulation of the Drive Field current's properties. The

*Primary Arrays* shown in the generalized schematic diagram below (Fig. 2) have control grids which allow an arc resistance imbalance to be imparted to the otherwise symmetrical Field current, so that they *render the two relativistic current impulses variably non-isometric*: thereby yielding thrust that is essentially **reactionless**! And the simple DC *Primary Power System*, like the early Faraday disk dynamo, is *wholly rotor-based* . . .

**Note:** It can be seen that the propulsive thrust developed by a StarDrive vessel is essentially brute-force in nature – it's produced simply by means of a controlled variable imbalance in the continuous *physical impact* of the two external hemitoroidal electron current streams with the collectors! If these two Field currents were of equal magnitude, no net force would be developed. However, if the "lower" current stream is stronger than the "upper", the vessel will be propelled away from the stronger current – in the "upward" direction. Since there's no 'backward' exhaust produced in the process, this type of thrust is truly and demonstrably reactionless in nature.

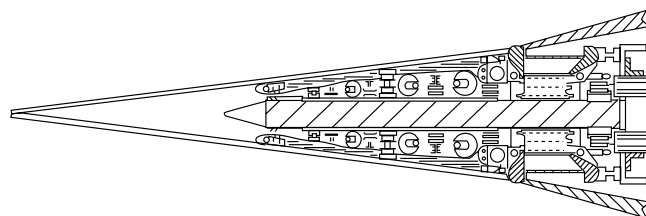


**Fig. 2**  
Generalized schematic of rotor & dual induction ring assemblies

Needless to say, tremendous quantities of heat are produced in the StarDrive device's electron "targets" or collector housing sections, and liquid sodium must be pumped through each Primary Array's ceramic resistor network as a coolant. However, this excess heat in ground-based units may be used in the commercial generation of electric power and desalinization of seawater.

In fact, because an intense arc discharge field has the unique capacity to absorb vast quantities of quantum background energy, the EDF Generator is so efficient that the latter task may become truly cost-effective for the first time! And not only will large **over-unity** StarDrive Dynamo units be able to produce electric power at 60 to 720 MW output levels, they'll be able to do so for many years before the permanent magnet banks must be remagnetized!! *The only truly external input energy*

*required in the interim is that necessary to initially bring the rotor up to speed . . .*



**Fig. 3**  
A denumbered version of Fig. 1  
from the EDF Generator Patent

Those of you who find this advanced technological prospect for the 21st century as exciting and fascinating as we do should consider making the

inventor's book *StarDrive Engineering* a valuable addition to your personal or reference library.

### **A Layman's Description of the StarDrive Device**

Nearly anyone who endeavors to gain an initial understanding of the *Electrodynamic Field Generator*, even a scientist or engineer, is likely to ask for a concise layman's explanation of "how it works". This isn't easily accomplished, for this device represents an unorthodox and multidisciplinary technology. However, the overview provided below will discuss the operative characteristics of the machine's simplified *electric power generation variant* in what is hoped to be the most direct manner possible. In this case, when people ask the question above, what they generally mean is: "By what means is *over-unity* operation achieved in a 'StarDrive' Dynamo?". It is assumed here that the reader has not only already become acquainted with certain basic aspects of the design, but also understands that *over-unity* operation is an absolute prerequisite for any viable system of light-speed interstellar propulsion.

By way of further background, the formative mechanical design basis of the EDF Generator is of course the original Faraday disk dynamo. For whatever reason, no one seems to have bothered trying to develop this simple machine into a more sophisticated and *patentable* form before now. The principal limitation of Faraday's disk dynamo in its original form was that, when one or more permanent magnets were used to pass flux directly through the plane of a solid conductive rotor, a rather high-loss heavy current at very low voltage was produced. The first design improvement was therefore to use rotor-mounted toroid field coils in order to generate a much higher-voltage primary current, and to segment the rotor to reduce "eddy current" losses. Also, the toroid coil configuration absolutely minimizes Lenz losses, or the magnetic "drag" that is experienced by any conventional generator's rotor.

To eliminate the use of brushes, it was necessary to apply traditional vacuum tube design and operating principles. Fortunately, most of the original patent work in this field has passed into the public domain, so incorporating certain aspects of that work into the EDF Generator presented no impediment to its patentability. By using plane-parallel electrode arrays instead of brushes to charge the rotor, it is possible to limit that portion of the induced rotor current which passes through the field coils to a very low level – effectively isolating them from the actual output circuit. More importantly, however, it then becomes possible to thermoelectrically charge the Generator's housing itself in such a way that *it* carries the device's full output circuit current instead!

The reason for this unorthodox design parameter is that it was desired to actually incorporate a standing

electric arc field into the output circuit, to take advantage of the electron's inherent ability to absorb quantum background energy [including *zero point energy*, if and as necessary]. As a result of a thorough study of lightning, the inventor of the StarDrive device reasoned that the electrons comprising any naturally-occurring bolt of lightning had to *recover* (or absorb) an amount of ambient photonic energy equal to that which they expended in transit – in order to satisfy the conservation of energy principle. In such a case, it is not necessary that "we" do the *work* of moving charge *against* a potential gradient; the work may be done by the charge itself in being attracted *along* the potential gradient (or voltage level).

And since it is known from the field of welding that it takes less energy to sustain an arc than it does to initiate it, it therefore becomes possible to create an electrical circuit that outputs more energy than it requires as input. This is exactly what the EDF Generator does – by incorporating a standing arc field in its output circuit. Using the StarDrive device as our mechanism, "we" only provide the work-energy required to establish and maintain the external field's potential gradient, by initiating rotor rotation and bringing the thermoelectric elements up to temperature. The electrons in the electrodynamic field do all the rest . . .

### **Further Notes from the Inventor**

In conjunction with one of our *StarDrive Generator* prototype project funding proposals, we are presently working on an interim proof-of-concept experiment for our proposed 24 kW air-cooled EDF Generator prototype. This full-scale mock-up of the 30"-dia. Generator's rotor and dual induction ring assemblies is intended to demonstrate the fundamental design principal discussed at the close of the Technical Overview (linked to our website's Method of Operation Summary page), whereby the voltage electrostatically induced on the rotor anode rings which power each Primary Array should be roughly one-third (1/3) of the Field Coil voltage (because of the capacitive dual induction ring geometry of the Primary Power System). For safety reasons, the Field voltage in all *air-cooled StarDrive Generators* will be limited by design to 850 VDC, and to 1,400 VDC in the larger *liquid-cooled StarDrive Dynamos*.

The experiment will also assist greatly in the derivation of remaining production model specifications, and will in fact incorporate production-quality rotor segments and electrode rings. Should this proof-of-concept experiment be successful, not only will the ability of our *over-unity* 24 kW Generator prototype to deliver large-scale DC output that's compatible with standard AC inverters (for utility grid distribution or off-grid conventional use) be virtually assured, but a major milestone incentive in our existing funding proposals will have been fulfilled as well. Further

updates like those below will be forthcoming on the News page of <http://www.stardrivedevice.com>.

**01/28/03 - International Patent Filings Secured!:** We are very pleased to report that we were successful in our efforts to secure numerous international (PCT) Patent Application filings for the *Electrodynamic Field Generator* by the final deadline of January 21, 2003! These important filings were effected in Australia, Canada, the People's Republic of China, the European Union (including France, Germany, Italy, Spain, and the United Kingdom), India, Japan, Mexico, the Russian Federation, and South Africa.

The securing of these key Patent Application filings adds immeasurable value to our StarDrive Engineering Project overall, as it will greatly protect and enhance our investors' upside global market potential (assuming, of course, that our 24 kW StarDrive Generator prototype is successful)! Be sure to check back from time to time for further updates as we proceed into the development phase of the Project.

**11/07/02 - Academic Reference:** Those of you kind visitors to our website who would like to have the benefit of an informed and unbiased academic opinion regarding the Electrodynamic Field Generator are welcome to contact John J. Tulip, Ph.D., Exec. Vice-Pres. of *American International University*. This consideration also applies of course to those parties who may be interested in securing a direct participation in our forthcoming EDF Generator Prototype Project. Dr. Tulip has not only expressed much-appreciated support of our efforts to introduce this important new technology, but has also had the opportunity to review our technical manual *StarDrive Engineering*. You may contact Dr. Tulip via e-mail at [TulipJJ@aiuniversity.edu](mailto:TulipJJ@aiuniversity.edu) although we ask that you expect him to field serious and respectful inquiries only. Should you desire to speak with him by telephone, please be assured that he will endeavor to return your call whenever circumstances permit if you provide him with the proper phone number.

**10/07/02 - Joint Venture Agreement Announced!:** Mark Tomion, founder and president of Archer Enterprises and inventor of the recently-patented *Electrodynamic Field Generator*, is very pleased to announce that he has signed a Joint Venture Agreement with Affirm Technology Partners of Carlsbad, California to build a working prototype of his over-unity 'StarDrive' device's electric power output variant. The co-developers are planning to commence construction of a small air-cooled **StarDrive Generator** unit with a projected output rating of 24 kW and a housing diameter of only 30 inches, at a total weight of under 50 lbs., before the end of November 2002.

Should this exciting project be successful, it would represent an historic milestone in the development of over-unity electric power generation technology.

Not only is this small prototype EDF Generator expected to demonstrate a *minimum Coefficient of Performance in excess of 20:1*, but the design employed is completely linearly-scalable in a very broad range of sizes that would include liquid-cooled **StarDrive Dynamo** units with output ratings of up to 1 gigawatt! The most remarkable feature of these large Dynamo units is that an amount of recoverable thermal energy comparable to their respective electrical outputs will be made available for desalinating seawater, or for use in centralized municipal and industrial hydronic heating systems. And this capability would make the large-scale desalinization or distillation of water truly cost-effective for perhaps the first time ever.

Interested parties are welcome to contact Mr. Tomion at [office@stardrivedevice.com](mailto:office@stardrivedevice.com) (585-526-6817) for further information.

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# Prospects of Hydrogen Energetics

Ph.M. Kanarev, Russia

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*Hydrogen is the only pollution free and inexhaustible energy carrier. But the implementation of such attractive properties of hydrogen is restrained by large expenses of energy for its production from water. Modern level of knowledge gives the opportunity to reduce these expenses [1], [2], [3].*

It is known that a gram-atom is equal numerically to atomic mass of the substance, and a gram-molecule is equal numerically to molecular mass of the substance. For example, the hydrogen gram-molecule in the water molecule is equal to 2 grams, and the oxygen gram-atom is equal to 16 grams. The gram-molecule of water is equal to 18 grams. As the mass of hydrogen in the water molecule is  $2 \times 100 / 18 = 11.11\%$  and the mass of oxygen atom is  $16 \times 100 / 18 = 88.89\%$ , the ratio between quantity of hydrogen and oxygen is preserved in one litre of water as well. It means that 1000 grams of one litre of water contain 111.11 grams of hydrogen and 888.89 grams of oxygen.

One litre of hydrogen has mass of 0.09 grams, one litre of molecular oxygen has mass of 1.47 grams. It means that from one litre of water it possible to produce  $111.11 / 0.09 = 1234.44$  litres of hydrogen and  $888.89 / 1.47 = 604.69$  litres of oxygen. Thus, one gram of water contains 1.23 litres of hydrogen [1].

Now energy consumption for production of 1000 litres of hydrogen from water is 4 kWh and of one litre – 4 Wh. As it is possible to produce 1.234 litres of hydrogen, then  $1.234 \times 4 = 4.94$  Wh are spent for production of one gram of water now.

## Instruments and Equipment Used for the Experiment

A special experimental low current electrolyzer, a voltmeter of the highest accuracy (accuracy class 0.2, GOST 8711-78), an ammeter of the highest class of accuracy (accuracy class 0.2, GOST 871160), a balance with value of a division of 0.10 grams and 0.010 grams, and a stopwatch with value of a division of 0.1s.

## Experimental Results

Indices	Sum
1 – duration of electrolyzer operation connected to the supply line, in 6 cycles t, min	$6 \times 5 = 30.0$
2 – readings of voltmeter V, volts	13.6
3 – ammeter readings I, amperes	0.02
4 – power consumption ( $P = V \times I \times t / 60$ ), Wh	0.136
5 – duration of electrolyzer operation disconnected from the supply line, in 6 cycles t, min	$6 \times 55 = 330.0$
6 – solution mass change m, grams	0.44
7 – mass of evaporated water m', grams	$0.02 \times 6 = 0.12$
8 – mass of water converted into gases m'' = m - m', gram	0.320
9 – power consumption per gram of water converted into gases $P' = P / m''$ , Wh/grams of water	0.425
10 – existing power consumption per gram of water converted into gases P'', Wh/grams of water	4.94
<b>11 – reduction of power consumption for hydrogen production from water, <math>K = P'' / P'</math>, times</b>	11.62
12 – quantity of released hydrogen, $\Delta M = 0.320 \times 1.23 \times 0.09 = 0.035$ , grams	0.035
13 – power content of hydrogen being produced ( $E = 0.035 \times 142 / 3.6$ ) = 1.397, Wh	1.397
<b>14 – energy efficacy of water electrolysis process (<math>E \times 100 / P</math>), %</b>	<b>1027</b>

Note: Gas output is clearly observed during many hours after the electrolyzer is disconnected from the electricity supply.

## Conclusion

Low ampere water electrolysis is a way for production of inexpensive hydrogen from water and hydrogen energetics.

## References

1. Ph.M. Kanarev. The Foundation of Physchemistry of the Micro World. Krasnodar, 2002. 320 pages
2. <http://book.Kanarev.innoplaza.net>
3. [hppt://www.n-t.org/tp/ns/if.htm](http://www.n-t.org/tp/ns/if.htm).

# Heater Producing Healthy Effect

## The First Device of Healthy Life Support in Fuel-Energy Industry

A. Belyaeva, L. Savelyeva, O. Bondarenko, Kirghizia

<http://www.leteco.h1.ru>

Email: [leteco@mail.ru](mailto:leteco@mail.ru)

Nowadays problems of rational use of resources including energy resources are very important. Lack of energy-efficient technologies causes consumption of great amount of electric power, coal, and mineral oil. From another hand, in the XXI century one of the main approaches of human society development is turned to healthy life-style and development of ecologically appropriate technologies. Hence, basic direction of heating systems development should correspond to, at the least, two requirements, i.e. effectiveness (energy-saving) and ecological appropriation (ecological functioning). Moreover, it is necessary to take into account additional requirements for modern works:

- Relatively low prime cost of the systems;
- Minimal operating costs;
- Availability of a system of temperature mode control;
- Use of domestically produced materials for the systems.

*The aim of the work is creation of a universal electric device of natural ecologically appropriate materials. The device should maintain relative air humidity of natural atmosphere in a quarter, make its ecology healthier, meet all the listed requirements, and represent new generation energy-saving system designed for heating of industrial and domestic areas according to features of technical solution.*

A.L. Belyaeva is the author of this work. The invention of this heating device was acknowledged as the best invention of Kirghiz Republic of the last two years. A.L. Belyaeva was called as a laureate of a competition of "The Best Inventing in Kirghiz Republic in 2001-2002".

Solving this problem the author based on work experience existing in the area of semi-conductors production. Actually, the model was worked out in the common area of electric engineering and industrial crystals growing. Using of knowledge and skills of the both areas made creation of this device possible.

It should be noted that initially the invention of the heating device, which is discussed here, was

connected with necessity to improve microclimate and air atmosphere in a semi-conductor shop since the industrial process required optimal conditions. Hence, the device was observed as an element of the industrial process. However, soon other positive characteristics of the device were disclosed, i.e. when it was installed in a quarter all visible mould disappeared. Laboratory investigations stated that the operating device annihilated all pathogenic microflora. This rediscovered feature allowed using the device both in domestic and industrial area. After series of following laboratory investigations and bench tests construction of the device was changed and improved that allowed prepare it for line production.

### **Ceramic electroconvector: general characteristics**

The working name of the final version of the model is *Ceramic Electroconvector TY 2971-006-22997241-2002*. Ceramic Electroconvector is an industrial and domestic electric heater of direct stationary action. It has high effective heat emission and satisfies ecological, sanitary, medical, and fire-prevention requirements.

At the same time it should be mentioned that by several characteristics this electroconvector differs from other known models of electroconvectors as well as from other existent heaters. It may be observed as a representative of an independent, specially created group of heating devices.

One of the main characteristics of the electroconvector is presence of constructive heating carbonic elements made of ecologically appropriate natural *non-metal* materials. Essentially, the electroconvector construction does not contain metal (the only metal part of the device is its supporting construction).

Production of heat of physiologically comfort zone requires 0.3 kW/h energy consumption which is 3-10 times less than energy consumption of known models of heating engineering. The Ceramic Electroconvector influences positively on ecology of a room. Room heating occurs better and more softly



as conducting carbonic elements can be heated maximally up to 100° C. As a result oxygen is not burnt, and air is not overdried in a room. Achieved minimization of metal content in the constructive elements of the device increases the level of ecological compatibility both of electroconvector constructions and operation.

**The device accumulates no static electricity, neutralizes harmful magnetic field** generated by alternating current in the conducting element (it is typical for all the other electrical household appliances). Therefore, **the additional positive effect** is produced and higher ecological characteristics of functioning of this electroconvector are confirmed.

Insulating strength of ceramics prevents electrical shock accidents. Ecological compatibility of the electroconvector is provided by materials of the construction. The base of the device is a studied natural silicate fiber which has quantitative and qualitative content of useful chemical elements which are the closest ones to the group of medical adsorbents listed in a medical encyclopedia. The ceramics is adjusted to emit electromagnetic waves only in infra-red spectrum.

The electroconvector produces heat waves in the average IR spectrum (8.4-8.6 mkm) which is maximally approximated to the diapason of heat waves generated by a human (9.37 mkm). It annihilates humidity of buildings independently of outer space humidity. At the same time it neither burns oxygen nor overdries air.

Healthy effect is produced by all the constructive elements made of ecologically appropriate natural materials. Electric power is transformed into heat emission by conducting elements. This process causes a mode of generation of a continuous heat spectrum of radiation. The heat radiation is similar to heat spectrum of radiation generated by a human. At the same time, this feature together with resonant oscillations of the crystal lattice of the ceramic cylinders produces a destroying effect on pathogenic and conditionally pathogenic microorganisms.

From the point of view of room ecology the proved healthy effect of the operating electroconvector becomes very significant. The effect considers continuous presence of a human in the room, i.e. risk of pathogen infection through respiration objectively decreases.

Application of the ceramic electroconvector is especially actual in patient care institutions and children's institutions, in special precision industries and space technologies. It can also be used in saunas with dry vapor.

The ceramic electroconvector is designed for unsupervised continuous work.

## Structure of the electroconvector producing the healthy effect

Shortcomings of known electric heaters are: great electric power consumption (0.75-3.0 kW/h), big number of metal details, complex technical performance, and use of a necessary additional blower as a ventilator. Big number of metal details decreases ecological compatibility and productivity of the heaters. The listed devices have to use high temperatures on heat-release surfaces for warming up rooms up to the level of physiological comfort. This causes increase of energy consumption. Moreover, using of metal heating elements influences on air and relative humidity in the room. According to available data, no existent electroconvectors have healthy influence on ecology of a room.

The represented ceramic electroconvector contains a carrying frame with horizontal boards which have convective gaps. The carrying frame has heat-release monolithic hollow ceramic cylinders whose walls contain longitudinal through holes. Heating carbonic conducting elements and de-energized carbonic rods are built in the through holes. The heating conducting elements are connected in parallel-series circuit at the output of the cylinders with it's ends placed into insulating supports of the carrying frame.

Constructive heating elements are the main differences of the device. All the heat generating constructive elements, i.e. conducting and de-energized heating elements, as well as heat-release surfaces of ceramic cylinders have contiguous spectra of infra-red radiation.

## Energy-efficient effect

The electric scheme of connection of the conducting elements provides different modes of work of the device. According to these modes, energy consumption is in the interval of 0.05-0.3 kW/h. The mode of 0.05 kW/h is calculated on a supporting level of warming-up of a room. Maximal energy consumption (0.3 kW/h) corresponds to the superior limit of the temperature mode of heating of working heat-release surfaces of the ceramic cylinders. In this case temperature of the heat generating elements, i.e. de-energized carbonic rods and conducting carbonic elements) lies in the limit of max 100°C. This produces a significant potential resource of electric strength and of durability of the used elements. The de-energized carbonic rods function as heat accumulators at switching on and switching off the device. Heating the conductors the de-energized rods accumulate heat through the ceramic walls of the cylinder till their temperature becomes equal to the temperature of the conducting elements. Appearing electromagnetic resonance between the conductors and the de-energized carbonic rods

intensifies infra-red radiation of the ceramic wall. Accumulative heat potential of the de-energized carbonic rods allows maintain uniform radial heating of the heat-release ceramic surface of the cylinder without decreasing energy consumption. In this case additional conducting elements of infra-red radiation become unnecessary.



The heating efficiency of the ceramic electroconvector was estimated by independent experts. Surface density of the radiation flow was calculated by formula of Stefan-Boizmann distribution law. Taking into account heating of the cylinders' surfaces up to  $70^{\circ}\text{C}$  this value came to  $727\text{ W/m}^2$ . **Total heat generated by the electroconvector per hour comes to 600 kcal or 698 W** at the total area of the radiation surfaces of  $0.96\text{ m}^2$  (on the basis of  $1\text{ kcal}=1.163\text{ W/h}$  according to [1]). The electroconvector consumes  $300\text{ W/h}$  and produces  $698\text{ W/h}$ . That is to say that it effectively transforms electric energy into heat energy. Operational modes of the electroconvector are based on analysis of the heating effect produced by different devices, i.e. a tube metal heater (TMH) having a conducting metal element of Nichrom, a ceramic cylinder having a Nichrom conducting element, and a ceramic cylinder having a conducting element of carbonic ribbon. The carbonic ribbon produces high heating efficiency. Temperature on the surface of the ceramic frame is up to  $80^{\circ}\text{C}$  and temperature on the conducting element is  $100^{\circ}\text{C}$ . Hence, the device

equipped with the conducting element of the carbonic ribbon does not produce excessive heat radiation.

***The electroconvector consumes 300 W/h and produces 698 W/h.***

After one-year operation of the preproduction models in a private school it was noticed that number of respiratory illnesses and influenza among the pupils slumped, condition of skin became better, attacks of bronchial asthma among the teachers stopped, and allergic itch left the patients who suffered from allergy. A side effect was that flowers began to grow better, and those which had not blossomed began to blossom at least. Obviously, a combination takes place there: air cleaning of microorganisms, humidity normalization, warming comfort, and influence of pyramidal ceramic structures on water vapors which are transported by warm blasts.

### Applied Know How

Ambient air in rooms is a complex substance including various chemical compounds, ions, dust parts, water vapors, infectious and potentially infectious microflora, etc. The electroconvector is represented by a ceramic hardphase crystal structure. Cold air blast moves close to the ceramic surface. It meets combined oscillation of crystal microlevel structures of ceramics. *Filtering electromagnetic screen* appears that breaks shell of pathogens and potential pathogens. It is a performance of **sanitation properties**. Atmospheric water contacts with structures of ceramics, then it is cleaned and structured. After that water cleans air which is breathed in by a human. Hence, the organism becomes healthier. It is a performance of the **healthy effect**. A clean room warmed uniformly improves human's health.

### Main Performance Attributes of the Ceramic Electroconvector Producing Healthy Effect

Nominal required power	0.05-0.3 kWt/h
Voltage of the feeding network	$220 \pm 22\text{ V}$
Frequency of alternating current	50 Hz
Temperature of the conducting element in operation mode	$50...110^{\circ}\text{C}$
Temperature of the heat-release surface of the cylinder	$39...90^{\circ}\text{C}$
Surface density of radiation flow	$727\text{ Wt/m}^2$
Quantity of radiated heat	600 kcal/h
Class of protection	1
General area of heat-release surfaces of the cylinders	$9600\text{ cm}^2$
Sizes	$410 \times 400 \times 75\text{ mm}$
Weight	18-21 kg
Durability	30 years

The ceramic electroconvector is designed as a floor construction for repetition work.

### References

1. Heat Engineering Reference-book, Moscow, Energy (Energia), 1975, V. 1, p. 12.

## About the author



After graduating from Polytechnic University of Frunze city Alexandra L. Belyaeva (1953) participated in launching of semiconductor production. She was given a rank of Perfect Inventor and Rationalizer for invention and rationalization action. In 1987 her invention named Method of Production of Monosilicon Seed Crystals was introduced into manufacture, according to close copyright of USSR. Since that year this introduction has allowed grow monosilicon having better semiconductor properties. She was given a rank of Inventor of USSR for the invention.

Alexandra L. Belyaeva has acknowledged and given a rank of Inventor of Kirghiz Republic. Since 1994 in collaboration with Russian specialists of ceramics she has been dealing with organization of ceramic productions in Kirghizstan. Here are the inventions by Belyaeva: Method of Production of Seed Crystals and Its Variants (Patent #42 KG), Ceramic Mass for Insulators' Production (Patent #43 KG), Ceramic Mass Having Heat-Radiating Properties (Patent #464 KG).

In 1992 Belyaeva was rewarded with a Silver medal of VDNH (Exhibition of Achievements of National Economy, Moscow) for development of technologies for production of constructive nitride-cadmium items of semiconductor wastes.

Her Method of Production of Nonexpendable Seed Crystals is at introduction stage. The seed monocrystals produced by the new method will allow grow ribbon monocrystals having certain properties. It will be possible to produce items made of the monocrystals which will meet requirements of energy-saving and ecological appropriation. These devices represent non-aging powerful energy sources, various semiconductive devices with no inner microdefects and with unlimited durability, structural water filters.

Since 2002 she has been dealing with organization of production of ecologically appropriate industrial-domestic appliances causing healthy effect. The invention of Ceramic Electroconvector Producing Healthy Effect is now introduced. Energy-saving of the new ecologically appropriate electroconvector exceeds energy-saving of all the existent heating systems.

Belyaeva is a laureate of competition of The Best Inventing in Kirghiz Republic in 2001-2002.

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# Inertial Propulsion Device

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*A body is at rest or moves linearly and uniformly until it is not influenced by an external force.  
(School course of physics)*

*Forget everything that you were taught at school.  
(Arkady Raykin)*

This propulsion device consists of an engine and a body. The engine (see Fig.1) is remarkable for its movable stator (S) which can make free rotation as well as a rotor (R). When the engine starts the stator and the rotor begin to rotate in opposite directions. Thus the engine has two ends and one of them is connected to a flywheel (F). This flywheel begins accelerated rotation.

A cross-beam (CB) is connected to the second end of the engine where a rotating momentum appears. Under the influence of this momentum the cross-beam presses down one of the supports placed on the body (for example, Sup.1). As a result a force which is compensated by acceleration of the flywheel (F) appears on the support. When the flywheel is accelerated up to certain speed a control system (CS) switches the windings of the engine to change the direction into the opposite one (reverse). At that the cross-beam also tends to turn to the other side and presses down the second support (Sup.2). Thus the cycle repeats. It should be noted that forces acting at the supports are **codirected** and they move the whole device.

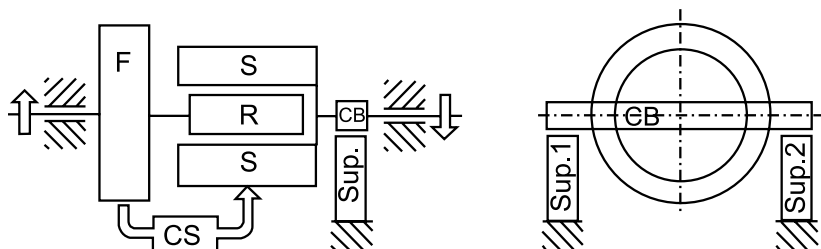


Fig.1

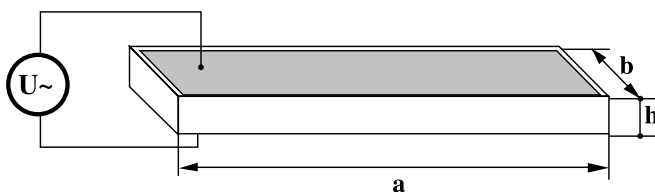
# Unlimited Accelerated Nonreactive Motion

by G.P. Ivanov

Information from <http://tts.lt/~nara/ruspopul.htm>

Bias of centre of inertia of the closed system is a phenomenon exceeding the bounds of modern scientific conceptions. At the same time it is a way to the new marvelous world of earlier unknown laws and phenomena of nature. Researches made by G.P. Ivanov, Russia, have allowed him come to the following conclusion: it is a quite realizable task to create technical devices which can move under the action of nonreactive forces. However a purposeful scientific-research spade-work is required for the reliable registration of them by modern experimental facilities. According to the author during the whole XX century the known idea of latent impulse were misleading the scientists from the serious research of impulse-energy processes existing in systems at the presence of quasi-stationary electric and magnetic fields. According to G.P. Ivanov, it is related with the fact that the notion of "latent impulse" has nothing in common with the real momentum, since the very existence of "latent impulse" and "latent energy" which attends it, would make it impossible, for example, to adjust radio equipment since all effective capacitances change their value a hundred and thousand times as much (it depends on their orientation with respect to the magnetic field of the Earth).

Fig. 1, 2 demonstrate the patented by G.P. Ivanov method of realization of nonreactive motion (G.P. Ivanov, Yu.G. Ivanov. Method for production of propulsion. Patent #2172865, M., 2001). Fig. 1 demonstrates a device which consists of magnetized core with the attached metal electrodes.

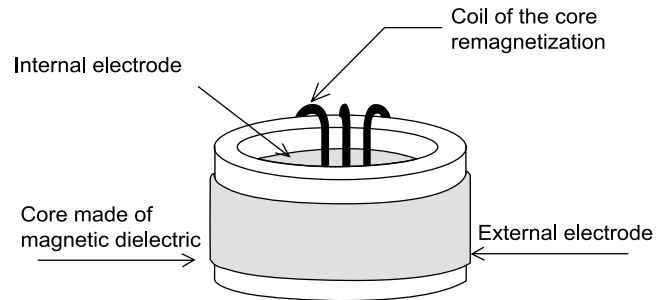


**Fig. 1**

The simplest "nonreactive" element

When alternating voltage is applied the device together with the center of inertia of the whole system (including power source and lead) will oscillate under the action of nonreactive force. It will move along the direction which is perpendicular to the vectors of electric and magnetic fields inside the core.

On Fig. 2 there is an analogous device supplied with a cylinder core. Magnetization of the core is defined by current of the coil which is wound around it (see Fig.2).



**Fig. 2**

Diagram of the device which can be in unlimited accelerated nonreactive motion

Let us supply the electrodes of the device with such voltage which is enough to change field density in the core (for example, according to the law  $E = E_0 \sin \omega t$ ), and the coil with voltage enough to change the magnetization (according to the law  $M = M_0 \cos \omega t$ ). Then nonreactive force which is constant in its direction will act on the device along the axis of the cylinder. The average of the force is  $F_{cp} = \pi f E_0 M_0 V / c^2$ , where  $E_0$ ,  $M_0$  are the amplitudes of density values of the electric field and amplitudes of the core magnetization,  $f$  is frequency,  $V$  is core capacity. As a result the device can either move with acceleration or act against external forces. The researches allow the author to prove the validity of the following theorem: **At motion of the open-loop system (device) the work made by nonreactive force could not be realized by means of decrease of energy of the proper (appurtenant to the system) power source.** Where this energy comes from if there are no artificial power sources outside the device? However everywhere there is such form of matter as electrovacuum. It allows us come to a conclusion that nonreactive forces make work by means of decrease of electrovacuum energy.

Existence of electrovacuum does not contradict to the modern physical picture of the world. On the contrary providing the realization of laws of momentum and energy conservation, this idea originates from and organically supplements it. The theory of electrovacuum opens quite realizable prospects in different fields of human activity which seem to be fantastic and impossible. It also proposes unusual ways to solve many problems which are considered as insoluble. For example, it becomes possible to create nonreactive cosmonautics and private aircrafts. Energetics will be changed beyond recognition since power sources which require no material fuel will occupy the place of big and small modern electric power stations. The analogous list could be continued. There are presented quite realizable prospects related to inexhaustible reserves which are hidden in the ambient space.

# Revolutionary Current

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*Electricity is one of the most wonderful inventions of the 18th century. It can be produced by various methods in which different types of energy are used such as mechanical or chemical energy. In this article we discuss a new type of methods in which **electrostatic energy** is used.*

In this method we use **electrets** as an energy source. Electrets are permanent polarized dielectric material which is made by cooling dielectric material in a high intensity electric field. When we place an electron in the electric field of a point charge, it is influenced by a force. If the direction of the force is such that the electron moves in a closed path then it represents a current in the opposite direction along the closed path. Here closed path means a metal wire loop in which the electron movement is responsible for the current.

The charge of the electrets remains constant for many years (100) and there is no loss of energy because we use only the property of electrets that they apply force when a charge is placed in its electric field. Since here we create energy in the form of electric current then it violates the Law of conservation of energy.

Let us discuss the method in three steps:

- 1) Fundamental
- 2) Equivalent circuit
- 3) How we can use it as a potential source of electricity.

1. When we put a metal rod in the electric field of a point negative charge then the electron is influenced by repulsion force which moves in arrow direction and the electric field is cut by putting an earthed metal plate from any direction. When we place four charges on the corner of the metal frame and shield the electric field in particular direction as shown in Fig.1 then the force on the electron which is placed in metal frame will be in the direction of arrow and this makes a loop. The force influencing on the electron will be continuous, so the current which moves in direction opposite to the electron movement will induced in the metal frame.

2. The equivalent circuit of Fig.1 is shown in Fig2. It demonstrates that a 'V' volt battery and a resistance 'R' can be replaced by an arm of the metal frame. The polarity of the battery is shown in Fig. 1. A current of

magnitude  $(V/R)$  will be induced in the circuit by this method.

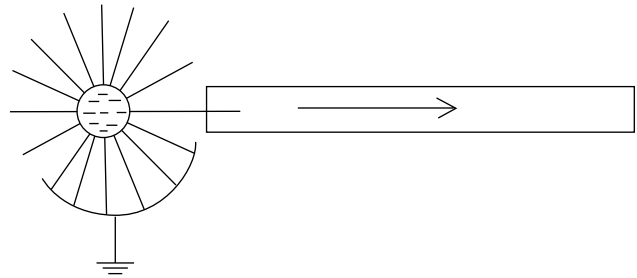


Fig. 1a

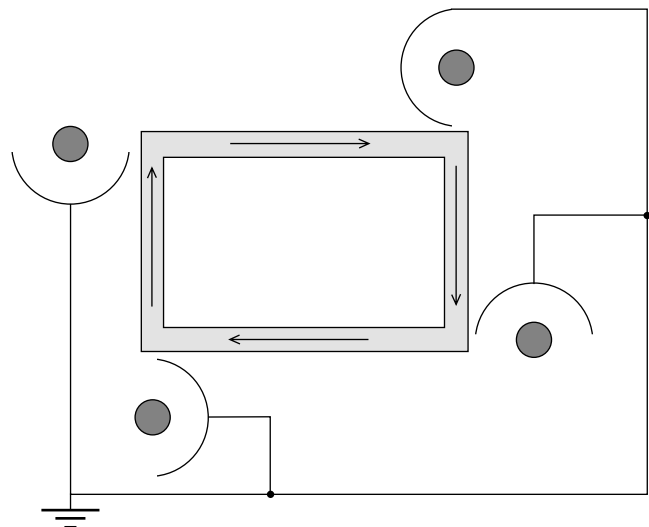


Fig. 1b

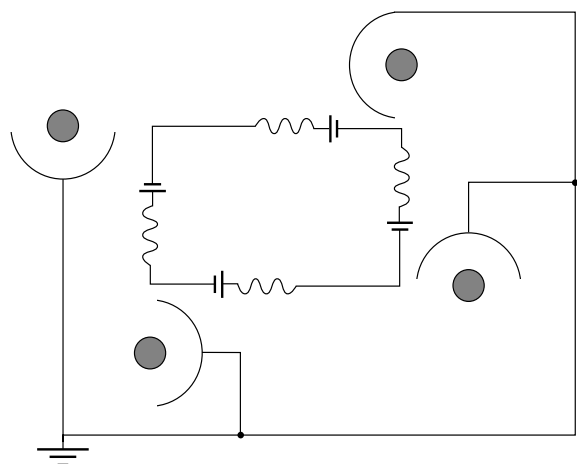


Fig. 2



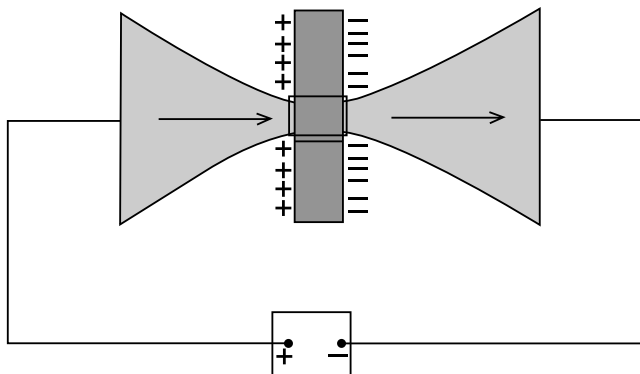


Fig. 3

3. We can use another device as a potential source (see Fig3.). Let us take an electret and make a hole at the centre. A hollow thin walled metal cylinder is fitted in the hole and a metal frame is taken as shown in the Fig. 3. We can use this metal cylinder as an electric field shield which may affect the direction of the force influencing on the electron. We may use this device as a potential source of electricity which will give electricity until the charges on the electrets vanish. The charge on the electrets remains constant for many years. Thus we can create energy and the problem of energy shortage can be solved by this method forever. We are trying to make a prototype of this but due to lack of equipment facility we are not able to demonstrate a working model. However we are trying to modify it.

## NEWS REVIEW

### Russian scientists are preparing new application of energy of geothermal waters

<http://www.sciteclibrary.ru>

A way for economical use and utilization of energy of geothermal waters was found in the Institute of Geothermal Problems (Russian Academy of Sciences). The new technology can be applied for heating in different purposes, and can compete with the power engineering, which uses the conventional energy carriers.

Geothermal springs are ideal for generating electricity by means of using of their permanent heat. This is especially important for Kamchatka, which is rich in these springs; however they are almost never used in mass power engineering, but only serve as an attraction for tourists, who admire beauty of Kamchatka geysers. At the same time the region itself freezes every year because of shortage of fuel for electric power stations.

What prevents us from using the geothermal springs?

The problem is that the storages of most of geothermal water fields have low and medium temperatures. This does not allow providing their competitiveness as regards conventional energy carriers. During tens of years this fact was an obstacle to the development of geothermal energy.

A solution was found in the Institute of Geothermal Problems. It was brought out that at many exploited geothermal fields wellhead overpressure exceeds 5-10 MPa and more. These waters contain fair quantity of dissolved organic gases. The scientists have found out that methane content of these waters exceeds 90 %. And until now at exploitation of the fields these types of energy have not been properly utilized.

The scientists of the Institute of Geothermal Problems have developed a technology of the optimum utilization of energy of geothermal waters and have increased the thermodynamic effect of the process.

This aim was fulfilled by means of transmission of thermal energy of geothermal water through the intermediate heat exchangers to the secondary heat carrier. Chemical energy of dissolved gases was used as an additional source of energy. The transmission was held by the use of primary and secondary separators. The distinctive feature of their technology is that associated potential energy of geothermal water is used as an additional source of energy. Expander and compressor placed on the same shaft are used as potential energy converters. Gas-holder and gas control point are used for utilization of energy of dissolved gases.

Thus on the bases of this technology geothermal energy can be effectively developed that will be competitive with fuel hydrocarbon energy.



# Tilley Electric Vehicle



**Tilley Foundation, Inc.**

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*Editor: The advantages of electric vehicles were proved more than once. No fuel is required to set them in motion. Along with evident advantages of electric vehicles, such as their powerful characteristics and harmlessness for environment there is a side benefit, i.e. much less maintenance as compared with gasoline or diesel-fueled vehicles is required. Moreover it is easier to manufacture such vehicles.*

*In the previous issues of New Energy Technologies magazine we have already acquainted our readers with Tilley Electric Vehicle designed by Carl B. Tilley (USA). Below there is some up-to-date information and photos from the inventor. Besides we also publish an article devoted to the similar types of fuel-less motors.*

After several years of personal accomplishments in the alternative energy industry, Carl B. Tilley was convinced that it was possible to build an electric car that could be powered without the help of external power to keep the battery charged.

The concept to produce a useful electric performance car that would last more than a few hours and would be economical to run, safe to drive around town or across the United States and never use a drop of fuel challenges the future of transportation as we know it today.

With the establishment of the Tilley Foundation, Inc., in the year 2001, Carl Tilley set out to prove it could be done. It was an ambitious project and it broke ground on the facility in Tennessee that would build the first self generating electric car.

***...you have no need for fuel and you do not have to stop the vehicle to charge it after driving.***

Construction of a 1,800 square foot building, that was powered with another recently developed electric device, began in the year 2002. Electricity from the building built the car from a different energy invention, that was void of any outside power supply. It is ironic that one alternative energy device actually built the invention to power and build the electric car.

From the selection of the proper car to be converted, to the advanced technology which is on board, the **Tilley Electric Vehicle TEV** performs comparably to gasoline powered vehicles. The difference is you have no need for fuel and you do not have to stop the vehicle to charge it after driving. There is no pollution and you can cruise the highways at the same speed as any other vehicle.

The rear mounted electric motor provides over 130 SAE net horsepower at 5,500 rpm. It offers a 3 speed automatic transmission that is smooth shifting and totally silent running. All this is combined with rack and pinion steering and a 35/65 rear weight bias that enables fast, sensitive handling and needs no power assistance.

***...battery system will be fully charged at all times while in use.***

It has 4 wheel disc braking for fast progressive, fade-free stopping. Counterbalanced gull-wing doors need only 14 inches of clearance. The rear sporty louvers are aerodynamic designed so that it almost eliminates any drag effect. All this with a stainless steel body makes for a great car.

Control center for the battery bank only allows what is needed to keep the batteries charged while in operation no matter what the speed or discharge from the battery bank. Your battery system will be fully charged at all times while in use. Simply get in, start the car and drive like any other vehicle.

A 1981 DeLorean was converted as the Tilley Electric Vehicle. Conversion of the car began in late June of 2002. State of the art metal fabrication to construct support for the electric motor, battery bank, control center and the TEV device was completed in July of 2002.

Several tests were made to validate the TEV technology. One of the last tests was made on September 7<sup>th</sup>, 2002. It has been demonstrated that after 17.3 miles driven on the Superspeedway at speeds ranging from 80MPH to 96MPH independent engineer certified batteries were full.

## Assembly Pictures (see also the cover page)

Photos by Robert Gaither



**Fig. 1**  
Removing Gas Motor



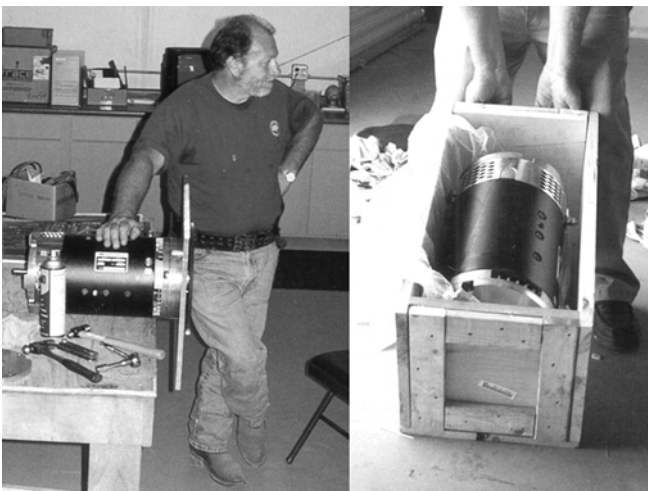
**Fig. 4**  
Fitting Parts



**Fig. 2**  
Fabrication



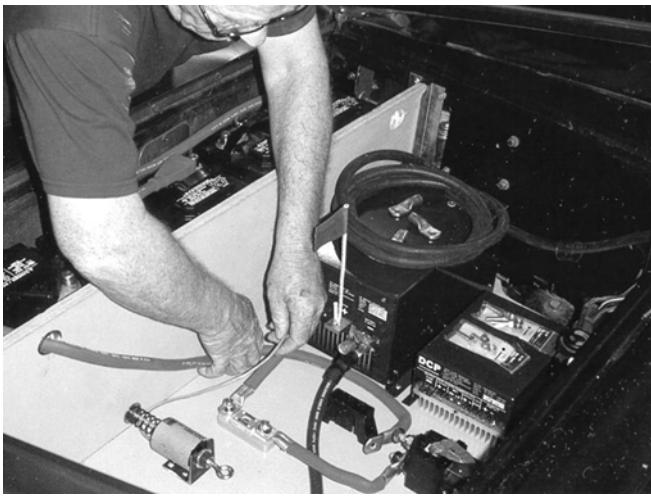
**Fig. 5**  
Transmission Work



**Fig. 3**  
Drive Motor



**Fig. 6**  
Motor Mounted



**Fig. 7**  
Making Connections



**Fig. 9**  
Special Wiring & Guages



**Fig. 8**  
About Ready



**Fig. 10**  
Car Unveiling

# Trends in the Application of Motor-Generators

**Adrian Akau, USA**

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If the Tilley generator-motor should enter into the world market, some curious consequences may result, the most important being the transition of the Honda and Toyota hybrid cars into full fledged electrics.

First of all, a comparison should be drawn between the Tilley and the two hybrid cars presently being sold, the Honda Civic and the Toyota Pirus should be made.

The Honda Civic and the Toyota Pirus both use charging systems with a gasoline motor for better mileage. The Tilley motor-generator is a stand-alone electric vehicle. The Honda motor-generator is just

60mm thick and provides (10kW or 13hp). The Toyota Pirus has a 44hp unit (American Version) which feeds power into electric motors at the wheels. Both Honda and Toyota gasoline motors are off at 0 mph. Only the electric system is used until the power demand reaches 10 kW; then the gasoline motor automatically kicks in. The Pirus is able to get higher milage in city driving than in country driving from the fact that the ratio of the power from the electric part to power to the gasoline part of the motor is greater at lower than at higher speeds, that is, less power is needed to run the car in city driving than in country driving because of the lower speeds and air resistance.

American car companies are beginning to develop their own starter-generators to "save an extra 10% on the gas milage". Are they doing this because they don't want to be left behind in the milage competition or because they really understand the nature of the starter-generator motors used by the companies producing the hybrids?

With the advent of the Tilley motor-generator, a new factor enters into the situation. If the system proves valid, does this mean that Honda and Toyota are out of the running? Hardly not! It is likely that these companies have allowed or even planned for this contingency with larger capacity motor generators which would do a similar job. With their fine cars and superb engineering, the transition from a hybrid to a pure electric might be costly but not too difficult to engineer. Each of the two hybrid companies may already have been built, tested vehicles of this nature. However, since the primary purpose of the car companies is to make money it is doubtful if this full-fledged fossil fuel-less type will be placed on the market unless competition so requires. A car using the Tilley motor-generator might certainly push them in this direction.

Should the Tilley remains undeveloped, one might expect the second level hybrid car to arrive in a few years from Honda and Toyota. These cars should have greater electric generator-motor capacities and smaller gasoline engines. These systems could give small cars much higher gas milage and could also be placed in larger, more elegant vehicles such as the Honda Accord and the Toyota Camrey.

The transition to fuel-less motors should hopefully be slow and painless for both the pocket book as well as the human psych. If scientists cannot be convinced by studying conventional scientific laws on how these motors work, perhaps they will better see the need for the promulgation of new laws in this area.

We know that at the present time, both Honda and Toyota motor generators (M.G.) have a powers assist function while the Tilley stands alone. Let us look at

the present situation (we will use the Toyota U.S. M.G. because it is the more powerful version):

Honda and Toyota classify their M.G.'s as permanent magnet types; Carl Tilley says his is an advanced D.C. motor.

#### **Power output:**

Honda is given at 10 kW at 3,000 rpm or 13 hp  
Toyota is 33 kW at 1,040-5,600 rpm or 44 hp  
Tilley is up to 135 hp depending on rpm's

**Voltage/Battery** (Ni-MH=Nickle Metal Hydride, AH=amp hours)

Honda: 144V, 120 Ni-MH cells@1.2V ea., 6.5 AH  
Toyota: 274V, 228 Ni-MH cells@1.2V ea.  
Tilley: 144V, 12-12V lead acid (Wal-mart), 1200AH

#### **Physical Characteristics of each M.G.**

Honda: 60 mm wide  
Toyota: unknown  
Tilley: 9" dia., 146 pounds

The main effort should be to implement the transition away from the use of fossil fuels. We know this can be done but it takes proper attitude. Proper attitude takes knowledge and knowledge takes willingness to learn. Willingness to learn takes desire to learn and desire to learn takes humility. Unfortunately, humility is a characteristic that many people, especially learned ones lack. *Editor's: Carl Tilley's comments are also given below.*

***Very Good...you seem to know what we already were aware of...before we could mass produce our Tilley car I am sure some auto company would come out with basically the same thing...I do believe they already have it and they are just waiting for the right time. The good news is that at least the Tilley car lighted their fire to get them started.***

Carl Tilley

## **Read in the next issue!**

***In April 12 of 2003 scientific conference "The Time Machine" was organized by Faraday Laboratories Ltd in Moscow. There were presented the reports by V.A. Chernobrov, A.V. Frolov, A.V. Rykov, E.D. Sorokodum, V.J. Kosyev, A.N. Solonyi, V.A. Atsukovsky. There was discussed design of the device made by Faraday Laboratories Ltd. as well as main principles of control on temporal characteristics of physical processes by changing of density of space energy, i.e. aether density according to patent claim.***

***Details are in the next issue!***





# Electric Vehicle in Russia



Review by Correspondent Alla Pashova, Russia

The director of *EV (Electric Vehicles)* company located in Tolyatti (Russia), Alexander Mukhanov states: "If during 2 centuries intellectual efforts of a scientific thought were concentrated on an electric engine instead of the internal combustion engine then now we would have driven electric vehicles, and the greenhouse effect would not have exist".

The electric vehicle has driving-wheels which are set in motion by an electric engine, and it is powered by an electric battery. The electric vehicle appeared in Great Britain and France in 1880 and it is significantly older than the automobile equipped with the internal combustion engine.

At the beginning the speed and the fuel distance of the electric and gasoline vehicles were approximately the same. The main disadvantage of electric vehicles was a complicated system of recharge since there were no usual transformers of alternating current into direct one. Hence, the electric vehicle was recharged in a quite difficult way. An electric engine operated on alternating current was used to recharge it. The electric motor rotated a shaft of the generator which was connected to batteries of the electric vehicle. However in 1906 a rectifier which was simple to operate was invented. Despite its principle of operation was quite complicated (mercury vapor was used for transformation of alternating current into direct one) it has given a great stimulus for development of automobile industry.

There were no essential proves of advantage of gasoline vehicles as compared with electric vehicles. Nevertheless, even at that time there was an opinion that electric vehicles run more slowly and to shorter distances. However "gasoline" records were also insignificant and comparable with results produced by the electric vehicles. At the same time producers of electric vehicles did their best to demonstrate the advantages of these vehicles. If you remember, Walter Baker, one of the most famous American constructors and producer of the electric vehicles, achieved the speed of 130 km/h driving his car. An electric vehicle produced by Borland Electric company run from Chicago to Milwaukee (the distance of 167 km/h along non-asphalted road) without recharge. Next day after recharging the electric vehicle returned to Chicago by its own power without meeting any incidents. During the journey its speed came to 55 km/h.

In 1899-1900 a hereditary Russian nobleman Ippolit Romanov made an experiment on designing of the first Russian electric vehicle. Since these vehicles had been

designed to run in Saint Petersburg then the city council required to produce them in the same place. In 1899 Romanov's first electric vehicle was made. Its general design was borrowed from English cabs in which a cabman sat on a high dickey placed behind passengers. Romanov's electric cab had two passenger seats situated in front of the dickey in a half-cabin having side and back windows. The cabin was equipped with a hood. The seat of a driver was placed behind and above the cabin; a box containing an accumulator was located under the driver's seat. The vehicle was four-wheeled. Diameter of the front wheels was smaller than those of the rear wheels. The front wheels were fixed by elliptical springs and were driving ones. They were connected to two independent electric motors by a roller chain drive. The regulated rear wheels had a smaller diameter and were fixed by spiral springs.

This first electric vehicle was equipped with lead accumulator which had 36 banks. It required recharging every 60 versts (1 verst – 3500 feet). The total power of both the electric motors was equal to 4 hp. Design of the vehicular part of Romanov's electric vehicle was borrowed from the models produced by an American company named *Morris-Salom*. This company had produced electric vehicles since 1898; however those models had wheels of greater diameter as they were equipped with pneumatic tires, while Romanov's vehicle had wheels with light rubber rims. Both the electric vehicles had two electric motors, but the distinction of Romanov's electric vehicle consisted in the presence of 6-row ball bearings in the wheels.

Romanov's second cab was built in 1900. This model had entirely closed and glazed cabin for passengers. The chain drive was replaced by a gear; however the basic sizes remained the same. This model was equipped with an accumulator designed by Romanov. The general weight of the electric vehicle was 45 poods (750 kg), and the weight of the accumulator came to 22 poods (362 kg). It should be noted that weight of American and French electric vehicles exceeded these figures. The speed of both Romanov's models of the electric vehicles came to 15 km/h.

Romanov's first electric bus was built in the same 1900. The electric bus weighted 100 poods (1600 kg) could make speed up to 10 km/h. For reasons beyond Romanov's control, traffic of the electric vehicles in Saint Petersburg was not organized.

A vehicular company named "*Frezer and Co.*" participated directly in production of Romanov's

electric vehicles, i.e. a running gear of these vehicles was created by this company. In January 1900 *The Cyclist* magazine reported that this company had built an electric vehicle which had already been tested. A picture of this first electric vehicle by "*Frezer and Co.*" can be found in advertising publications of those years. Various firms proposed the innovation for sale and described its technical characteristics.

*Frezer* electric vehicle was four-seated, had two engines whose total power came to 7 hp. The advertisement booklets reported as following: "The accepted system of accumulator is remarkable for its solidity and life-time. Capacity of the elements is about 15 Amperes/ hour per a kilogram of electrodes. The size of the battery is defined according to calculation of 120 W/h per one ton and per one-kilometer of the distance; its weight is equal to 30-40% of the total weight of the vehicle including a payload". Weight of *Frezer* electric vehicle came to 70 poods (1120 kg). It made the speed of 15-18 km/h and required recharging every 35-50 versts of the path. The second variant of *Frezer* electric vehicle differed from the first one for less weight of the accumulator which was located above the rear axle.

In addition to the four-seated vehicles, *Frezer* Company produced two-seated electric vehicles equipped with engines of 3.5-hp power. The two-seated electric vehicle was remarkable for its more perfect steering tube. There is known one specimen of this model purchased by somebody from Riga (Latvia). Moreover, on the territory of "*Frezer and Co.*" there was a station for recharging accumulators of the electric vehicles.

In the period of the Soviet Union pilot batches of electric vehicles began to be produced only after the II World War. In general there were small lorries applied for transportation inside great buildings, for example, in a main post office or an airport.

Now there is a great probability that Moscow will be the first Russian city where the electric vehicles can find mass application. Russian capital suffers from gas pollution which is especially heavy in the center of the city. At the same time the budget of the city allows acquire own ecologically appropriate transport. Now financing of production of the electric vehicles is realized through the Fund of Ecologization of Moscow Transport. The means are assigned due to income taxes coming to the budget of the city.

To tell the truth, citizens of big cities know electric vehicles very well, i.e. usual trolleybuses and trams are electric vehicles despite they are not autonomous. An autonomous public electric transport has one advantage which is especially valuable in the conditions of the cities overcrowded by cars. This advantage is their mobility. Trolleybuses are inseparable with their wires that causes decrease of their maneuverability. For example, they cannot pass several cars which have been parked wrongly. In this

case a maneuverable and autonomous electric vehicle will run to the center of the road and pass the obstacle with ease.

A Moscow company named *Eltran* which deals with exploitation of electric transport has developed a model of EV which runs the distance of 60 kilometers without recharging. Total recharging of this electric vehicle takes about 5 hours, however a half of required energy they can obtain for 1 hour. Hence, if the accumulators are recharged before their full discharge then this vehicle can operate constantly. However, a developed infrastructure of charging stations is necessary for this aim.

From the economical point of view, EV does not yield to trolleybuses and trams which house more passengers but run twice more slowly than the autonomous and compact EV. Therefore EV does not experience difficulties in jams in the conditions of the traffic of the city. It maneuvers easily in thick traffic current.

Unfortunately, now EV cannot replace automobiles equipped with internal combustion engines. Imperfection of its accumulator batteries does not allow it to become a public vehicle. The battery imperfection causes a small run on one recharging, long cycle of recharging, and high price of the electric vehicle.

To tell the truth, EV has important advantages. Maintenance charges of EV are lower than the charges of the standard automobile requiring expenditures for support of cooling systems, powering systems and exhausting systems. The lifetime of the electric engine comes to 10 thousands hours. Quantity of operations for maintenance of the engine is minimal. For example, it is necessary to change brushes in the dc motor from time to time. As for a modern three-phase electric motor and synchronous ac motor they are practically maintenance-free.

EV is easy to drive. To start the car you should only insert the key, turn it and press the accelerator pedal. You do not need to make any manipulations with adherence or gearshift.

Use of EV is justified in so called zones of higher environmental requirements that are cities, parks, vacation resorts. Electric buses, developed by *Eltran* run in the public green space of All-Russia Exhibition Center. There are about ten compact commercial EV operating in Moscow.

Taking care of environmental sanitation the management of AZLK (big automobile plant) has developed EV on the basis of two production automobile models "Moskvich-2141" and "Moskvich-pikup-2335". "Moskvich-Elektro" (Fig. 1-2) at fully loaded mass of 2060 kg accelerates up to 60 km/h at 15 seconds. Maximum speed of the load-free vehicle is 110 km/hour. Cruising range at one battery charging

is 100 km, and it comes to 80 km with 400 kg of load. At present Electrical Vehicle "Moskvich" is filled with imported component parts, which are cheaper but functional. In time it will be supplied with Russian equipment that will make it cheaper.



**Fig. 1**



**Fig. 2**



**Fig. 3**

The model of truck equipped with electric motor "ZIL-Electro", the authors of which being called "AVEKS" and "Optimum-electro", also enjoys the support of the Fund of Ecologization of Moscow Transport. Various privileges and free passage to any location in public green zones are promised to the future owners of "ZIL-Electro".

Forty-eight lead-acid traction batteries of roll type (Optima battery) are hanged in pairs along the ramps of the truck. They are united into 4 sections (Fig.3). Capacity of these batteries is enough for 70 km running. Probable charging station for these machines is the loading/unloading point. Charging time varies from 30 to 60 minutes. Substantial disadvantage of

the model is that batteries take away a great percentage of carrying capacity. Among the advantages of the model there are small internal resistance, fast recovery (to 400 A), discharging to zero level without serious consequences.

A traction induction unit "ATAD-Optimum 50/120" serves as the engine for "ZIL-Electro". Its weight is only 100 kg and it doesn't require any diesel generator or transmission that compensates a little the loss of carrying capacity.

The engine is very simple. It is a non-contact rotor of a "squirrel cage" type rotating on the bearings. No brushes are used. Thus expensive maintenance is postponed for uncertain date. On the other hand there is asynchronism. It means that some equipment is needed for converting into three-phase current and further frequency and amplitude adjustment. However it is expensive and complicated.

In spite of all existing disadvantages, Electric Truck is considered to have a bright future ahead of it. There are several reasons for that:

- 1 The vehicle is manufactured from cheap production component parts.
- 2 The system of optimum vector control of the drive is introduced. (The torque and shaft speed of rotation is regulated precisely, energy of the batteries is used rather efficiently.)
- 3 Microprocessor system with feedback coupling and great number of sensors (current sensor, heat sensor, velocity sensor, voltage sensor) minimizes losses, prevents the motor and batteries from overheating, protects mains from short circuit in case of an accident.
- 4 The vehicle is reasonably priced (for such an exotic object) – about \$26 000 USD subject to serial production.

Volzhsky automobile plant has already been engaged in research of EV for a quarter of a century. Over 10 original models have been designed and produced for these years. They have been appreciated abroad as well as in Russia. These are electric vehicles "Poni", "Oka", "Elf", "Gnom", "Niva", "Rapan" "Lada-golf", etc.

The models manufactured on the basis of VAZ-1111 "Oka" became the most popular among them. These EV received many different rewards, and became world-renowned. For example, VAZ-111E "Oka", manufactured in 1993, kept all merits of a production midget car. Use of electric motor makes it a non-toxic and noiseless vehicle. Efficient fast-acting short circuit protection eliminates current rush, providing absolute car operating safety.

In EV of VAZ manufacture two direct-current motors are commonly used as a power-generating set. The first is a 25kW capacity motor with torque of 110 Nm.

Another one has 40 kW capacity and torque of 190 Nm. Motors of the first type are usually mounted on light vehicles, such as "Golf", "Oka-Electro", "Elf", while high-power motors are usually used for VAZ-2108, VAZ-2109, "Niva".

The first models of electric vehicles used to be equipped with nickel-zinc batteries. But as life time of these batteries is not long, it was decided to start using nickel-cadmium batteries, manufactured at Saint-Petersburg plants "Rigel" and "Istochnik". Nickel-cadmium batteries are power-consuming, they withstand temperature of  $-40^{\circ}\text{C}$ . The only drawback of these batteries is their cost, and as a consequence a high cost of the vehicle itself. Because of that the final choice has been made in favor of lead-acid storage batteries, which were mounted at "Gamma Golf" in particular, thus reducing its price by several times. The batteries are located under the driver and passenger seats. They allow discharge of 80-85% and provide cruising range without recharge of up to 100 km within city area and several times more on a highway. Power current is transmitted from the electric motor to the front wheels through single-reduction gear unit, which substitutes the transmission.

For the present time electric vehicles are not developed to take the place of automobiles with internal-combustion engine in all industries and spheres of application, but only as a specific vehicle for highly specialized utilization. They are utilized when use of internal-combustion engine is objectionable or impossible.

It is considered that so-called hybrid models of EV would be able to replace automobiles with internal-combustion engines. These are vehicles with two motors, an electric motor and an internal-combustion engine usually running on diesel oil. In this case the combustion engine works constantly, but under the operation modes of little air pollution. Besides, fuel consumption is also much reduced.

In this direction real commercial success is possible. For example, "Toyota-Pirus" has already been chosen as a personal vehicle by tens of thousands of customers, this being a good result for such an original construction.

Nowadays three circuits of hybrid propulsion system are generally known. The simplest one is a series circuit, in which combustion engine operates together with a generator, and battery or generator powers electric motor providing propulsion. Actually this is the same circuit of electric transmission that is used at quarry trucks. Its main disadvantage is great losses of energy at transmitting the torque to the wheels. In parallel circuit the output shafts of the motor-generator and combustion engine are rigidly bound, and it doesn't allow working in steady-state mode (i.e. with permanent rotations and load).

In the third circuit, which is also the most commonly used there are an electric motor, combustion engine and a generator. The output shafts of all these units are bound by planetary differential. This allows almost lossless distribution of power between the units, and provides sustained performance of the combustion engine. The disadvantage of this circuit is the extreme complexity of coordination of units operating.

A hybrid EV was produced in Russia by automobile plant "Izhmash" though it has not been put in mass production yet. At the developing of the propulsion system instead of unique components there were used units of Russian mass automobile production that is one of the fundamental design solutions. "Orbit" Izh-21261 was used as a base for the device. It was equipped with gasoline engine (of 30 hp power and  $650\text{ cm}^3$  capacity), drive dc motor ПТ-125-12 (of 120V voltage and 49 H/m torque) and eight accumulators 6CE-55. Twin-engined propulsion system works according to the parallel circuit of engine joint. Electromotor serves as starter and at the acceleration it operates simultaneously with internal-combustion engine. On reaching some definite speed the electromotor changes its operation mode to the mode of generator and charges the accumulators. When the loads at gasoline engine increase then the electromotor begins to operate together with it. Operation of the hybrid propulsion system is controlled by starting regulation electronic equipment. Control unit, speed transducer of crankshaft of the internal combustion engine, detector of the accelerator pedal etc. are responsible for coordinated work of the engines.

During the tests fuel consumption of the hybrid vehicle "Orbit" was less by 20% than that of the usual model. For Russian prototype it is a good qualitative characteristic, however foreign designers reach better results, for example, "Crysler ESX3", which was presented in 1998 at Geneva auto show, consumes 3.3 liter of diesel oil per 100 km of path.

Representatives of specialized Moscow companies producing EV assert unanimously that these are hybrid electric vehicles which should change public transport with internal combustion engine. To encourage the automakers it is useful to create the proper laws drawing on foreign experience. For example, in California, USA, automakers wishing to present their production in the state market should put out 2% of automobiles with null blast. Legal system also supports an automobile user who is provided for free parking and free or cheap recharge. The user is granted with maximum of discounts to encourage him buying EV which is still twice as expensive. However it is said that in one of the villages situated near Moscow where the so called new Russians live, everybody drive electric vehicles leaving their cars with gasoline engine outside the gates. It would be quite good if EV turns to the real vehicle from the extravagancy of nouveau riches and beloved creation of ecologists.

# The Richard Clem Motor and the Conical Pump

## An Investigation of the Clem Motor

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In December of 1992 Jerry Decker posted an article on the KeelyNet BBS, about a self-running motor that developed excess useable power. The information, gathered from newspaper and individual sources, gave an anecdotal account of the motor invented in 1972 by Richard Clem of Flower Mound, Texas. New information has since been added and can be found on <http://www.keelynet.com/energy/clem1.htm>.

Richard Clem worked with heavy machinery for the city of Dallas. He used asphalt-spraying equipment, which pumped liquid asphalt. He noticed the asphalt pump would continue to run for up to 30 minutes after the power was turned off. It was this discovery that led to the development of the motor. Modifications he made eventually resulted in a substantial 350 horsepower output from a 200-pound motor. Clem is said to have often driven a car, powered by this motor, up and down Central Expressway in Dallas. He claimed it didn't use any fuel, and only needed a change of oil every 150,000 miles.

The motor had only one moving part, a cone shaped rotor mounted vertically on a hollow shaft. Spiral channels cut into the cone wound around its length and feed into peripheral nozzles at its large end. When fluid flowed through the spiral channels it was ejected out the nozzles and caused the cone to spin. At a certain velocity, the rotating cone became independent of the starter pump and began to operate by itself. At an operating speed of 1800 to 2300 RPM the fluid heated up to 300 F, requiring a heat exchanger. Vegetable oil was used because at 300 F water boils and conventional engine oil breaks down.

A 12-volt battery was the only other power source. Clem never applied for a patent because his motor design was derived from the asphalt pump that was already patented. Fifteen companies turned him down before a large coal company offered to back him and signed contracts to sell the motor. Soon after the deal was signed, Richard Clem died of a heart attack.

The above account contains only what I considered to be relevant for analysis of the Clem motor. Visit <http://www.keelynet.com/> for the original material.

The gear pumps, typically used for asphalt spraying, do not match the description of the pump used by the city of Dallas back in 1972. There should be public records showing what equipment manufacture the asphalt sprayer was purchased from. Since the asphalt pump was patented, I searched for a pump patent that met the following criteria:

- 1) Patent issued on or before 1972.
- 2) Delivered pressure equivalent to a positive displacement gear pump.
- 3) Cone shaped rotor with spiral channels.
- 4) Self-propelling action.
- 5) Capable of pumping a viscous fluid like asphalt.
- 6) Large heat transfer to pumped fluids.

The following illustration (Fig.1) is from US Patent 3,697,190 (Truncated Conical Drag Pump). The patent was issued October 10, 1972 (criteria 1) and appears to match the description of the asphalt pump that Clem converted into his motor.

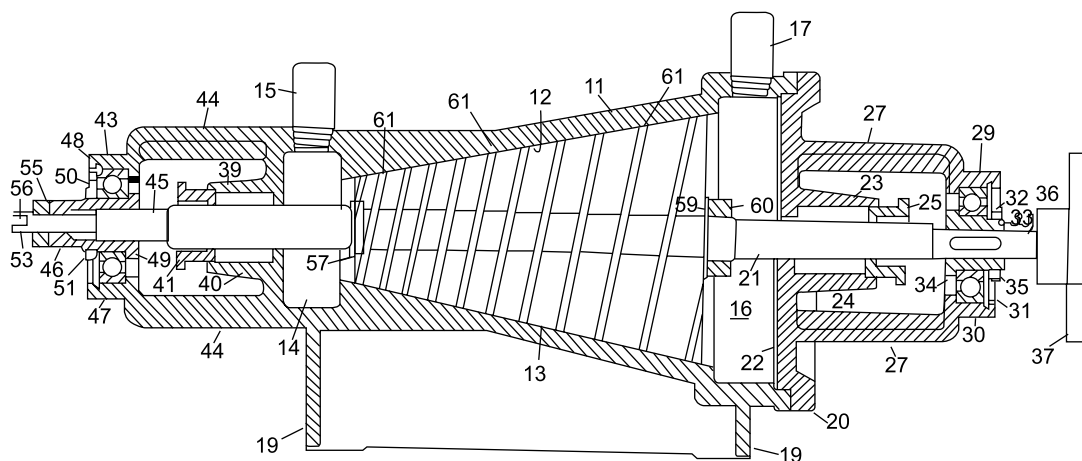
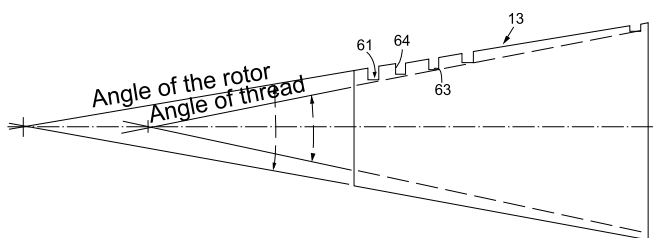


Fig.1

Housing 11, Conical interior wall 12, Conical rotor 13, Inlet chamber 14, Inlet pipe 15, Outlet chamber 16, Outlet pipe 17, Support feet 19, Detachable end cap 20, Rotor shaft 21, End cap wall 22, Boss 23, Packing 24, Adjustable gland nut 25, Bracket arms 27, Bearing boss 29, Bearing 30, Snap ring 31, Inner race 32, Sleeve 33, Shoulder 34, Retainer nut 35, Reduced diameter outer end 36, Coupling 37, Packing 39, Retainer 40, Gland nut 41, Bearing boss 43, Integrally formed bracket 44, Shaft reduced diameter 45, Bearing sleeve 46, Bearing 47, Snap ring 48, Inner flanged 49, Inner race 50, Nut 51, Shaft reduced diameter 53, Lock nut 55, Flat faces 56, Snap ring 57, Washer 59, Nut 60, Helical channel 61, Channel base 63, Channel sidewalls 64.

This is a high-pressure, low volume drag pump that can be used in place of conventional positive displacement pumps (criteria 2). It has a conical rotor that has a close fit clearance with the stationary housing wall. Delivered pressure is limited by back flow across the radial clearance and is inversely proportional to the square of the clearance. As a result, even a small increase in radial clearance would rapidly reduce pressure. The rotor is cone shaped so that the clearance can be controlled by axial adjustment of the rotor relative to the housing wall.

The conical rotor has two helical channels (criteria 3), in the form of square threads, spaced 180 apart for balance. The channel depth decreases as the rotor diameter increases. Fluid enters the channels at the small end of the rotor. The fluid is induced to rotate with the channel by boundary layer drag. The boundary layer is the thin layer of fluid adhering to the channel surface. Molecular cohesion tends to drag the adjacent fluid with the boundary layer. The fluid is also in contact with the housing wall. The boundary layer drag against this stationary wall slows the rotation of the fluid in the channels. Because the fluid rotates slower than the rotor, it is forced through the channels towards the large end of the rotor. In addition the fluid is forced towards the large end by centrifugal force.



**Fig.2**

The above drawing illustrates the proportional decrease in channel depth as the rotor diameter increases. Why was this done? Note that as the diameter doubles so does the circumference. This means the fluid has to travel twice as far in the same time to maintain a constant slip velocity. By

reducing the channel depth in half (cross-section area = depth x width) the fluid velocity is doubled thereby keeping the slip constant.

The spiral channels could be thought of as very long convergent nozzles. The increase in fluid velocity is in the opposite direction of the rotor spin. We should expect a reaction force from the acceleration of the fluid. This thrust would be directed tangent to the circumference and would increase the spin torque on the rotor. Even without the peripheral nozzles, that Clem later added, the pump rotor experiences a thrust force in a direction that would self-propel it (criteria 4).

Because fluid drag is the primary pumping force, it is well suited for viscous fluids like asphalt (criteria 5). The long channels also represent a large sliding surface area with frictional losses that would transfer heat to the pumped fluid (criteria 6).

All six of the patent search criteria have now been met. Of course this doesn't prove that it is the asphalt pump Richard Clem worked with.

A peculiar condition indicated by the patent is that as the velocity increases in the channels the pressure also increases. Bernoulli's Law requires the pressure to drop proportionally as the velocity increases. Assuming an ideal fluid without losses, when the channel depth is reduced in half, the cross section area is also half and this doubles the fluid velocity and the fluid pressure should drop in half. So what is going on here? There is a centrifugal component that would add to the fluid pressure.

My guess is it's too small to overcome the predicted pressure drop. Here is what I think may be going on. As the diameter and velocity increases the drag force propelling the fluid through the channel is proportionally greater. Energy is being added all along the length of the channel. Whatever the reason, if this high-velocity, high-pressure fluid is feed into tangent peripheral nozzles at the rotor large end, the energy will be converted to shaft horsepower.

The Clem motor is producing 350 shaft-horsepower and a large heat energy component. Where is this huge amount of energy coming from? Recent quantum mechanics zero-point field (ZPF) theories may point to the answer. From an article available at "BEYOND E=mc<sup>2</sup>" Bernhard Haisch, Alfonso Rueda & H.E. Puthoff [1]:

"Our work suggests inertia is a property arising out of the vast, all-pervasive electromagnetic field we mentioned earlier, which is called the zero-point field (ZPF). The name comes from the fact that the field is held to exist in a vacuum-what is commonly thought of as "empty" space-even at the temperature of absolute zero, at which all thermal radiation is absent."



ZPF researchers theorize that mass, inertia and gravity are not intrinsic properties of matter but the interaction of matter with the zero-point field. By all pervasive it is meant that the ZPF exists not only in empty space but it is passing through your body right now and everywhere else. When you throw a stone you are interacting with this field since the ZPF resists change in motion. In essence the ZPF is the modern day aether.

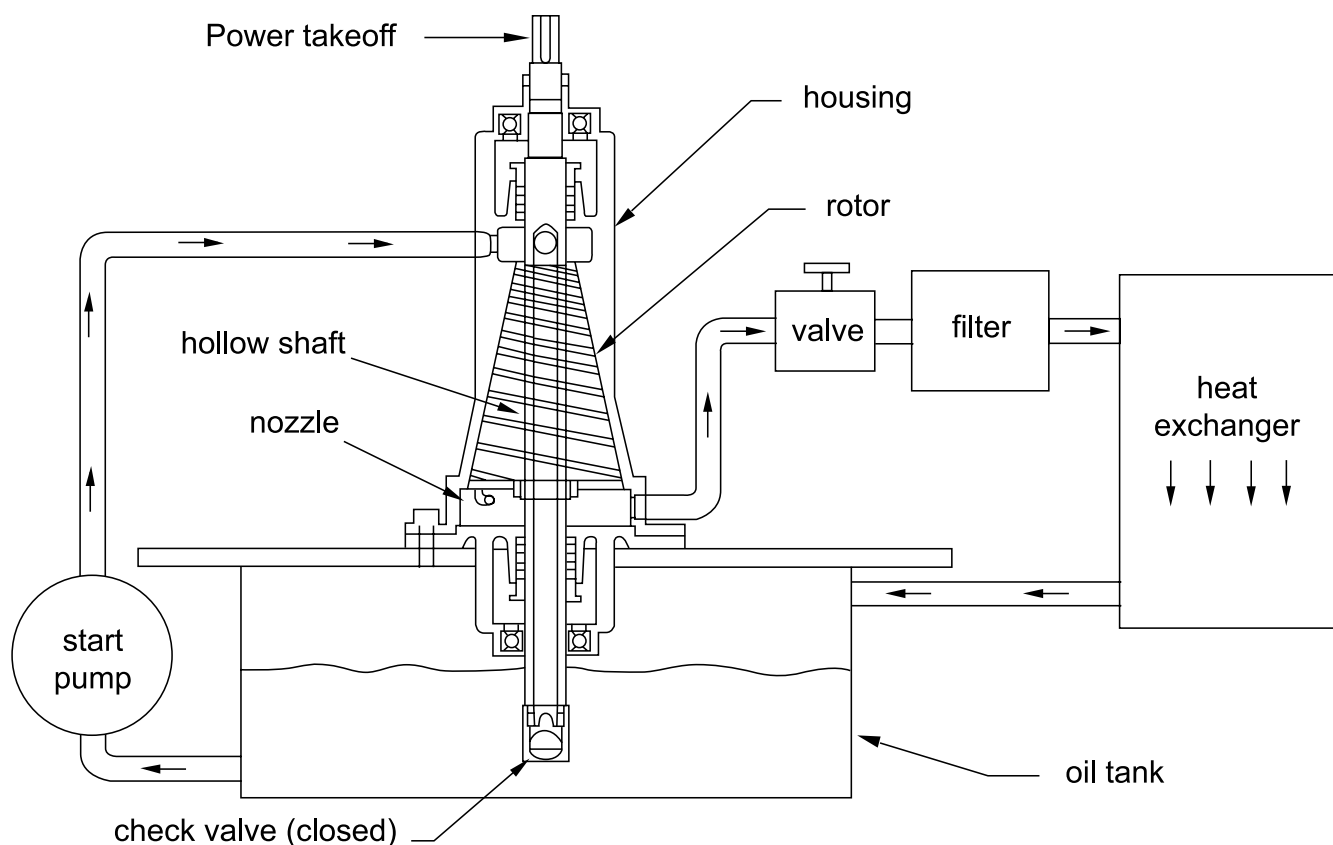
The amount of energy making up the ZPF is thought to be enormous. Is the fluid acceleration in the Clem motor interacting with the ZPF in such a way as to rectify it and draw energy from it? Is it a hydraulic aether-diode? The fluid, in the Conical Drag Pump, flows through long convergent channels. Disregarding the boundary layer, is this accelerated flow laminar? Would such a long orderly flow entrain the aether energy?

From the perspective of the rotating channels the fluid appears as the discharge from a long nozzle. To

exaggerate, if the fluid was held fast to the housing wall, the rotating channel would travel through the stationary fluid. This would be equivalent to achieving 100% efficiency. In reality the fluid is slipping against the stationary housing wall so that the rotating channel (nozzle) is moving faster than the fluid discharge velocity. Assuming the reaction thrust as the only propelling force, this would give efficiency greater than 100%. So, as the slip increases the reaction thrust decreases, but the efficiency increases.

Assuming the Conical Drag Pump is the pump Clem used, can it answer the following?

- 1) Why was a hollow shaft used?
- 2) Why was the cone mounted vertically?
- 3) Why was a starter pump needed?
- 4) How were the peripheral nozzles added?
- 5) How was the motor RPM regulated?
- 6) How did a large coal company get involved?
- 7) Was this kind of pump ever used in asphalt sprayers?



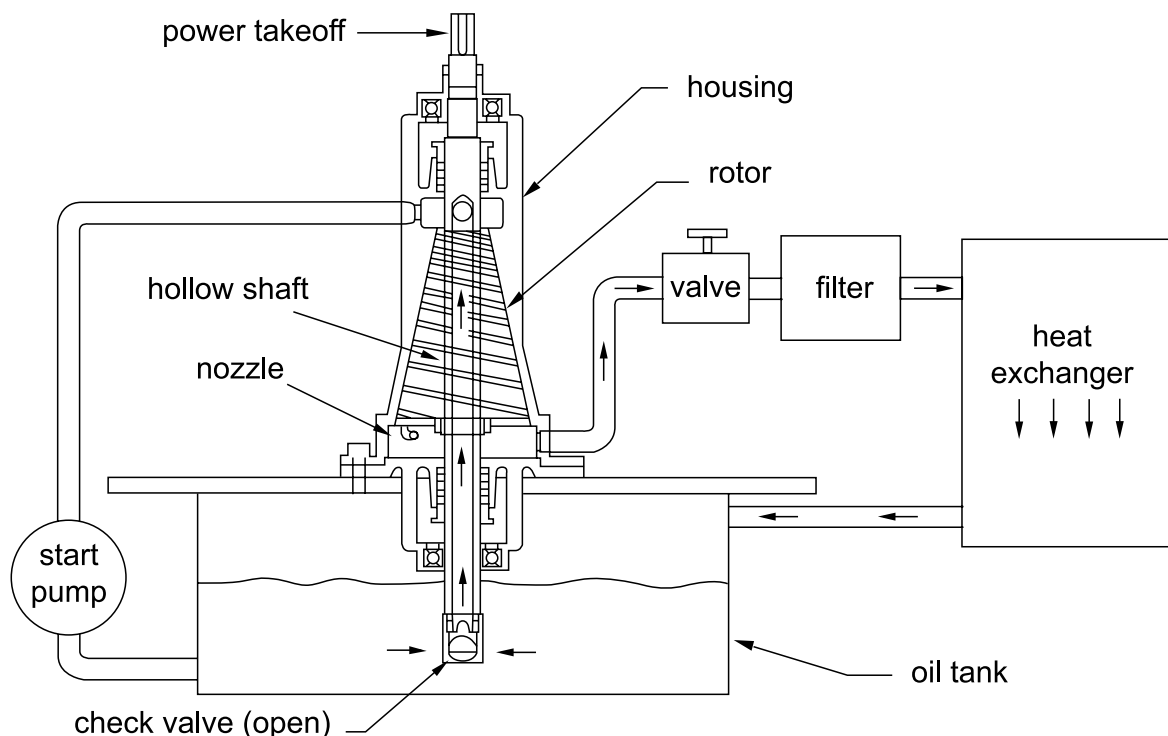
**Fig.3**

Clem motor shown in start mode  
The arrows show oil flow

The above drawing shows a hypothetical Clem motor based on the Conical Drag Pump. The motor is mounted vertically so that the check valve on the hollow shaft is submerged down in the oil tank. The hollow shaft extends from the oil tank through the rotor into the inlet chamber. The start pump draws oil from the tank and forces it up

the external feed line connected to the inlet chamber at the small end of the rotor. This fills the hollow shaft and forces the check valve closed. The oil flows into the spiral channels and out the peripheral nozzles. The reaction thrust of the nozzles spins the rotor. The oil flows through the return line, through the valve, filter, and heat

exchanger and back into the tank. The start pump is most likely a standard hydraulic gear pump. It continues to pump until the rotor spins up to its operating speed. The combinations of a start pump and check valve would be a simple way to both prime the motor and spin up the rotor.



**Fig.4**

Clem motor shown in operation mode  
The arrows show oil flow

Once the start pump is shut off the check valve is free to open. Oil is drawn up into the hollow shaft to the inlet chamber at the small end of the rotor. The spiral channels pump the oil down towards the large end of the rotor. A plate is attached to the large end of the rotor and fits with a close clearance with the housing wall. Nozzles attached to the outer edge receive high-pressure oil from the spiral channels. The jet reaction thrust from the nozzles delivers shaft horsepower to the power takeoff at the shaft top. Adjusting the valve to create hydraulic backpressure regulates the motor RPM. Closing the valve stops the motor.

When I first read about the Clem Motor I found it odd that a deal had been made with a coal company. Was there a connection with the pump? After finding the Conical Drag Pump patent, I wanted to contact the inventor Walter D. Haentjens of Barrett, Haentjens & Co., Hazleton, Pennsylvania. Otto Haentjens founded Barrett Haentjens & Co., in 1916. The business began in the coalmines of Pennsylvania with Otto Haentjens original patent on the balanced opposed impeller multi-stage volute pump. The company still supplies pumps to the coal industry.

They have expanded to other markets and their pumps are installed in many industries worldwide. It is now known as Hazleton Pumps Inc., after its acquisition by The Weir Group.

I contacted Peter Haentjens, the VP/General Manager of Hazleton Pumps, by e-mail to find out if this pump had ever been put into production. He replied that they had not done anything with the patent.

An unusual pump design would have a tough time competing in the market with an industry standard like gear pumps. The Dallas asphalt sprayer may have been a one of a kind field test of the pump design. Or the pump manufacturer offered it for testing to an asphalt equipment company in the hopes of generating interest in it.

#### References

Bernhard Haisch, Alfonso Rueda & H.E. Puthoff, "BEYOND  $E=mc^2$ " //The Sciences, Vol. 34, No. 6, November / December 1994, pp. 26-31 copyright 1994, New York Academy of Sciences.



# Spontaneous Flow Heat Pump

## PACES : The Alternative Energy

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**"Paces" is a new high performance electronic process.** It is not a traditional heat pump fitted with some electronic gadgets to improve its output, but a truly revolutionary process totally unused up to now. There are no moving parts, not even a moving fluid in it. "Paces" is an electronic process because for its development the pump's fundamental element uses micro-electronic techniques.

***...an average of 9000MW could be produced, that is to say the equivalent of several nuclear power stations.***

The principle consists in attracting the gas neutral molecules onto a so-called "electrostatic" plate, to accelerate them and heat the plate. An intense electric field is applied in a capacitor with micro-pores covering the plate. The neutral molecules are polarized and accelerated when they penetrate these micro-pores where the intense electric field exists. Each molecule accelerates and absorbs electrical energy when it enters into a pore. But in turn it decelerates and gives off an equal amount of energy upon its exit from the pore.

***The molecules, by going back and forth between the plates, continually give off and take energy, thus resulting in a total consumption equal to zero.***

The gas fluid does not undergo any change of thermodynamic state, contrary to all other heat pump processes. A thermodynamic cycle remains at the level of each gas molecule, but not at the level of the entire set of molecules.

There is more to this new process, it is not just heat pump process added to an already long list: **these new characteristics also enable some new applications.** Besides the traditional heat pump applications, due to its excellent coefficient of performance this process makes it possible to produce electricity by cooling the environment.

For instance, if the Rhine was equipped with heat exchangers into which diverted water could flow, thus cooling its temperature by just one degree, an average of 9000MW could be produced, that is to say the equivalent of several nuclear power stations. Please

note that this process would also enable **both electricity and fresh water to be produced from seawater**, an interesting application for areas of the world where water is a scarce resource.

Thus we have at our disposal an ecological process for producing electricity, it would become conceivable to produce hydrogen in great quantities; vehicles would be hydrogen powered. Ozone, CO<sub>2</sub> or any other type of pollution would become a thing of the past.

**It will most probably be the energy source of future generations**, ecological and excellent, inexhaustible, powerful yet completely harmless, stable and steady (contrary to the sun and wind); an invention capable of re-launching the world economy, in particular giving impetus to the currently depressed new technology sector.

**However, you have probably noticed that this invention requires advanced technology**, and the few French laboratories capable to develop this process have proven inaccessibility to do it for independent researchers such as the author of the article. Besides, the invention's claimed qualities, the revolutionary aspect was very often interpreted by examiners as 'utopian', even before they read the document! Having tired of battling against concept fixed for the past two centuries, the author of the article **has now decided to place this project within the hands of the international scientific and technological community**, in order to give the best chance of success to the invention.

***It will most probably be the energy source of future generations!***

**Initial development requires the construction of a prototype**; three possibilities are described on the website (<http://www.new-energy-paces.com>). As there is no longer legal protection abroad, anyone is free to experiment and to market, as he or she wishes, in all other countries outside of France.

**Please help me to spread the word about this project**, for example through scientific forums on the Internet. This will allow you to receive feedback and gather other opinions. Your participation, even the most modest, will be of use. To those of you who help this project to see the light of day, all of humanity will be indebted.



# Registration of Gravitational Waves

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Registration of gravitational waves is one of fundamental problems of physics. At the beginning of the last century A. Einstein's works predicted existence of these waves. Nevertheless, despite numerous attempts are made in different countries of the world these waves have not been fixed up today. Josef Veber, an American physicist working in 60<sup>th</sup> of the XX century, is sure to be called as the first experimenter who disclosed gravitational waves. Nowadays lots of many-million projects on registration of gravitation waves are developed and realized (LIGO (USA), GEO-600 (Germany-England), VIRGO (Italia), and TAMA (Japan)). However no positive results were achieved.

Failures in registration of gravitational waves can be explained by the fact that researchers have erroneous notion of the essence of these waves. This erroneous notion is laid in an experimental project that causes negative results.

Many researchers believe that influence of gravitational waves on the bodies should be resulted in deformation of these bodies (i.e. in change of mutual place of particles of a material body). All the attempts to disclose the gravitational waves are based on this notion. Now two types of ground gravitational antennas are supposed as priority.

The first type supposes the registration of mechanical oscillations of a massive test body that is initiated by influence of gravitational waves on it.

The second can register changes of a distance between space-apart free masses when gravitational waves act upon them. Great attention is paid to the second type of antennas in the developed projects. Failure attempts of registration of gravitational waves can be explained by their low intensiveness and insufficient accuracy of existing measuring equipments. Therefore, now there are made various attempts to register gravitational waves produced by such great cosmic phenomena as confluence of black holes. More accurate instruments and measuring equipments, for example, a laser interferometer, are developed. Nevertheless, positive results are hardly to be obtained.

Here is one of the fallacious explanations of action of gravitational waves on a body: *"Passing of gravitational waves changes an interval between*

*objects transferring them one from another like two boats sometimes are approached sometimes moved from each other by sea waves"*.

Following this example to explain influence of the gravitational waves on bodies placing on the Earth, it can be said that all bodies are in one boat and raising or sinking of the boat on sea waves does not cause change of the distance between the bodies. However, this example seems to be very simplified for explanation of influence of the gravitational waves on bodies. In fact, the case is much more difficult.

According to A. Einstein's theory, bodies moving with variable acceleration will radiate gravitational waves. **Gravitational waves represent the essence of changes of gravitational field occurring at light speed.** Since the gravitational field is a deformed space-time then the gravitational waves cause change of deformation of the space-time. Change of deformation of the space-time is accompanied with change of deformation of geodesic lines (i.e. lines by which all the bodies move).

A body moving by a geodesic line whose deformation is changed changes its acceleration. Change of acceleration of the body will change gravity applied to the body in this area of space. Hence, influence of gravitational waves on the body occurs through gravity which influences on it.

It is known that a fundamental difference between gravity and other forces appearing at a direct contact with a body consists in the fact that gravity provides all the elements of the body (all its points) with equal acceleration (deformation can not occur), and other forces influence on certain parts of the surface of a body and so cause its deformation.

Hence it is senseless to try to measure deformation of a body or change of a distance between test bodies occurring under influence of gravitational waves. It is necessary to note that, in particular, when a body is placed on an unmovable support relatively to the Earth, value and the direction of gravity coincides with weight of the body. Therefore, in this case gravitational waves can be registered at measuring of changes of the body weight.

An experiment on registration of the gravitational field of the Earth by measuring change of weight of

a test body was made. Before the beginning of the experiment there was set a problem to register gravitational waves produced by the Mercury and the Venus at approaching to the Earth. The gravitational field in which the Earth moves changes due to superposition of gravitational waves of other planets on it. These changes were necessary to be registered.

The experiment was as follows: a test body (a 100 grams weight) was weighted on an electronic balance in equal time intervals of 14 days. The experiment was lasting for 12 months. In the experiment it appeared that change of a distance between the Earth and the mentioned planets causes change of weight of the test body. The change of weight of the body occurred in proportion to the distance between the planets. The test body was weighted in the same conditions and in the same place. The performance of the experiment is so easy that every person can made it.

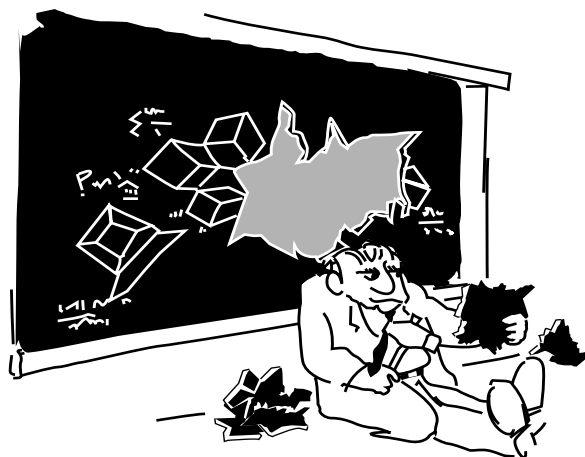
It is known that weight of a body changes (decreases) at moving along the Earth surface from its pole to the equator. Change of weight of a body locating in the same place has not been fixed until now.

The fixed change of weight of the test body proves change of gravity applied to it and, consequently, change of the gravitational field in which the test body moves as well as the Earth does. **These changes of the gravitational field were caused by motion (superposition) of the gravitational waves produced by the mentioned planets at their**

**approaching towards the Earth at the distance of the existent gravitational field.**

Hence, the Earth and all the bodies locating on it move in the constantly changing gravitational field, therefore, constantly change their weight. Nevertheless, as it is known, change of the gravitational field is the influence of gravitational waves on it. Hence, measuring changing of weight of bodies we can speak about registration of gravitational waves.

### *In search of the 4th dimension*



From <http://home.ural.ru/~meop/index.html>

## High-Energy Hyper-Low-Frequency Electric Field

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**The article represents a practical and theoretical research on possibility of existence of a high-energy hyper-low-frequency electric field which is interpreted by modern measuring instruments and subjective perception as a static field. Besides there are observed a problem of the field registration, a hypothesis of relic origin of the registered field and a hypothesis of wave nature of the Universe.**

A passenger on board a ship sailing in the ocean will never notice action of waves of high and low tide. At the same time, weathering waves of several numbers produce a dangerous storm. However, an ocean liner is designed for such a storm therefore the passenger would just experience some discomfort. It is another case if tide wave hides reefs... I wish our ship, i.e. the

Earth, the Solar System, the Galaxy, and the Universe, not to be lead to such a place by any ignorant "navigator"!

One of the most mysterious persons in the history of electricity physics was an outstanding inventor Nicola Tesla (1856-1943). When the majority of scientists developed researches of microworld particles he followed the opposite scientific path. He was interested in the electrical potential of the whole Earth. He researched ways to influence on it, control its state and methods of its regulation. Therefore many of his patents, experiments as well as a purpose of constructions and devices built according to his ideas arouse perplexity and misunderstanding of modern scientists.

Having formulated my own hypotheses I often think why such a Great Genius as Nicola Tesla took his invention away with him.

Danger of this invention lies in simplicity of production of devices for generating (detecting) energy.

## Practical Prerequisites

Prerequisites of this and other hypotheses were some undeclared effects occurring in practical wireless communication as well as investigation of devices for distant transmission of electric power.

Distant energy transmission was demonstrated by Nicola Tesla in 1892 in London and in 1893 in Philadelphia. However, even now the way he did it remains unknown.

In 1977-1985 I had to work a lot with radio transmitting equipment of different power of middle-wave (MW) and short-wave (SW) diapasons. According to fundamentals of physics, intensive electromagnetic field is produced around antenna curtain connected to a radio-frequency transmitter. There are brightly glowing gas-discharge electrovacuum devices at the distance up to several meters in this field. Attention was paid to the fact that more than ten daylight lamps of 80 W were successfully "glowed" at 40 W power of a transmitter. In this case a distant correspondent did not note significant decrease of a level of a received signal at the indicator of the receiver. It had to return to this fact in many years. The data of this experiment are represented in a particular document.

There is one more interesting effect which is disclosed when transmitting equipment (TX) and antennas (ANT) are adjusted. An incandescent lamp, which is connected to a certain place of a break of the antenna curtain or of a power feeder (L), glows brightly. The antenna circuit is not closed as galvanic element. (See Fig. 1).

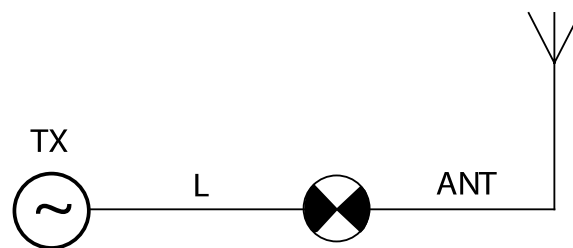


Fig. 1

Hence, the power line of the incandescent lamp is as if it is single-wire. It also had to return to investigation of this effect in many years. The data of this experiment are represented in a particular document. As in the case of the incandescent lamps, the correspondent did not note significant decrease of the level of the received signal at the indicator of the distant receiver.

S. V. Avramenko designed a plug of semiconductor diodes. Connecting this plug to a generator of alternating voltage of 10-10000 V by means of a single-wire line in the load of the plug he discovered current, which was continuous by the direction but pulsating by the value. Electric current measured in the single-wire line is very little, hence, the impression of superconductivity is produced, i.e. it is possible almost to avoid energy losses in the wires.

My experiments also represent a visual demonstration of the effect. For example, several links of light-emitting diodes connected inverse-parallel glow in the single-wire line. Garlands of light-emitting diodes and lamps having a single-wire power line can be produced. It is interesting that in this case power consumed by the generator do not increase practically (See Fig. 2, 3, 4). It was noted that if a standing wave is created around the generator "then an unlimited number of consumers would be able to apply a change of a value of this field to produce power in a load in their place" (*Editor: This phrase is in inverted commas since it is a part of the well-known article "Free Energy" by Alexander V. Frolov (Read in this issue, p. 15)).*

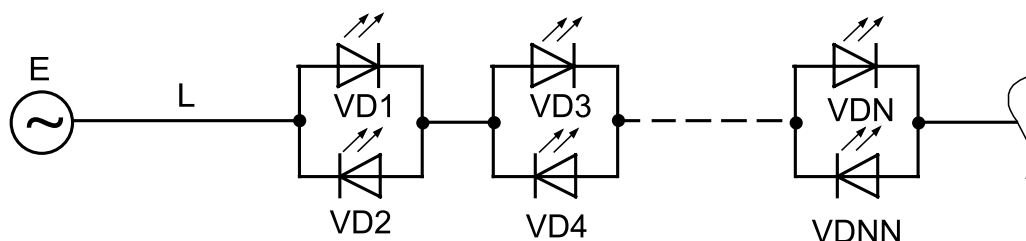


Fig. 2

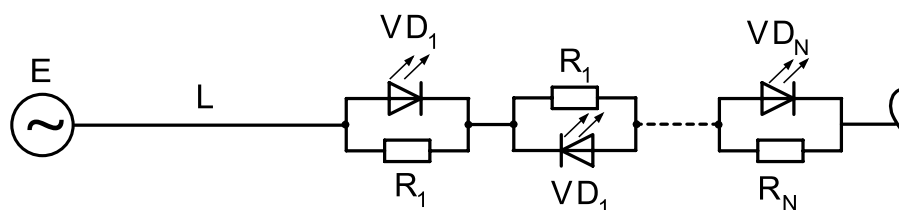
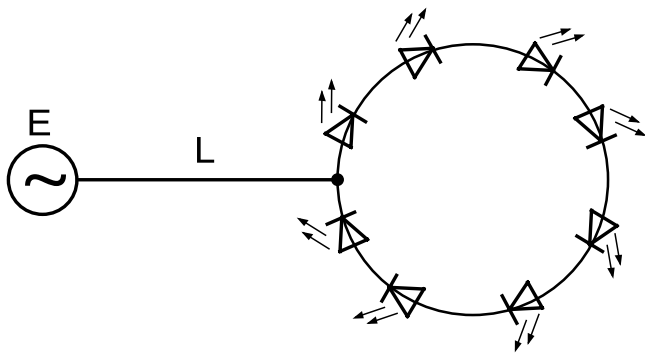


Fig. 3





**Fig. 4**

Russian scientists investigated this phenomenon and proposed an explanation of producing active power in the load by means of reactive capacitive current. This was made applying resonant properties of the single-wire line made of a metallic conductor. Further, possibilities of application of nonmetallic conducting mediums for transmitting electric power were investigated. However, the researchers pay attention for the fact that this explanation is insufficient.

A task group named "Analysis" from Voronezh city (Russia) made a qualitatively new explanation of results of S. V. Avramenko's experiment. The works of this group from Voronezh are devoted to the comparison of properties and characteristics of so-called inertial and inertialess currents occurring in circuits at low frequencies. Their general and particular features have been disclosed. In the works there are demonstrated conditions at which conductivity caused by inertialess discharges predominates in conductors and conditions at which currents caused by conduction electrons predominate. There are demonstrated a description of S. V. Avramenko's experiments and the conclusions made by the researchers. The authors cite data of their test experiments which prove a part of conclusions made by S. V. Avramenko and his colleagues.

However this explanation does not have a right to exist as it does not have variants for practical application.

Results of my theoretical and experimental researches allow provide a **fundamentally new (!)** explanation of energy "transmission" having occurred in the experiments performed by S. V. Avramenko, investigations by D. S. Strebkov, V.A. Kuligin and other investigators. (*Editor: See publications of these works in previous issues of our magazine*). Moreover, they allow explain origin of many physical phenomena and processes including the origin of non-inertial charges and currents and their visualization.

## First Hypothesis

Recently a number of scientists all over the world have declared a thought that surplus power is produced in the systems having overunit output due to inability to identify correctly all the existent energy sources. And

a so-called phenomenology is observed due to the inability to deal with different types of energy (or fields).

In physics a negation of an overunit device follows a well known state which is considered to be true in other fields of knowledge, i.e. energy conservation law. It should be noted that it is formulated for isolated (closed) systems. I have devoted some time to the investigation of this state and to practical experiments and come to the following conclusion: there are **no isolated (closed)** systems in the nearest cosmos which can be observed by us!

Particular physical, chemical and other processes may actually be observed in closed circuits for making calculations with sufficient approximation.

***Show me an isolated system, and I will prove that it is open.***

Hence, according to fundamental physical laws, energy does not appear from nothing and not disappear to nowhere. However, the source of oscillations, i.e. our generator, does not provide a load with energy; nevertheless, power is produced in the load. Energy conservation law must be fulfilled! The classical formulation of the energy conservation law is as following: total energy of an isolated system is not changed in the course of time. According to this, the only fact remains valid, i.e. the single-wire system is not isolated from outer influence, hence, energy is consumed from some other source which is outer in relation to the system?! In this case our generator is one of sources of information about an amplitude, frequency, and phase.

Calculations and experiments have allowed made a following supposition. Avramenko's diode plug is a particular case of a device known in radio engineering for a long time, i.e. AM detector (a peak-detector, a limiter, a frequency mixer). I have examined the other known circuits of AM detectors and frequency mixers. The investigations are continued and by this time the supposition has been confirmed.

**Let us accept an artificial generator (Tesla's transformer or any other one) as a main generator (or a main oscillator) and a hyper-low-frequency (HLF) oscillation of a huge amplitude as an envelope curve.** Let us name it as RW ("relic wave") without placing emphasis on the sense of the name.

Let us suppose that the field can be of:

- local origin (artificial radio transmitters);
- atmospheric origin;
- geomagnetic Earth origin;
- the Moon – the Earth;
- the Sun – the Earth (the Sun as a nuclear reactor producing electromagnetic radiation, the Solar System);
- galactic origin;
- Universal origin – the Relic Wave; in contrast to the relic radiation occurring in the diapason of SHF (i.e. in

contrast to the convenient notion) it is the diapason of HLF.  
- Etc.

The researches have demonstrated that the field of local and atmospheric origin may be excluded. The other variants require to be developed. Nevertheless, the variant of the Universal scale seemed to be the most probable. There is some reason for this supposition: the modern notion of the birth and the state of the Universe, i.e. the Big Bang and the expanding Universe. The known variants of scenarios of the Big Bang are based on a nuclear explosion of enormous power. The nuclear explosion is accompanied by an electromagnetic impulse (disturbance). It can be supposed that the Big Bang caused forming of a field having enormous amplitude values and long (great) period of oscillations. Probably, we deal with this field.

## **The second hypothesis about inconstancy, i.e. about wave nature of the Universe**

A Russian proverb says: "Everything passes, everything changes". Constant electric voltage does not exist (!). That, what is considered as the constant voltage, really is a constant component (occurring at a certain time interval). This component is formed by combining of variable sinusoidal oscillations and/or is a quite low frequency fundamental. Hence, it is a non-sinusoidal "changing" having amplitude linear part at the time interval of the observer.

For example, in reality a usual storage battery of "direct current" can not support invariable voltage, i.e. when a discharge appears the voltage decreases (changes in time, oscillates with a non-sinusoidal oscillation and a quite low frequency fundamental), when a charge appears the voltage increases.

It is necessary to observe the constant voltage occurring after a rectifier and even a stabilizer as a constant component existing in the time interval from switching on to switching off. This will correspond to that is proposed by Fourier!

***Show me a device producing constant voltage, and I will prove that the voltage is not constant.***

### **Conclusions**

If the supposition is totally confirmed then the statement that an electric field plays a fundamental role in the Universe will be valid.

We live in an electric field of a huge potential but we do not notice it. Since **our reference point is the amplitude value of RW field in our point of space** then the potential is equal to zero for our perception and for measuring instruments. Besides, **RW has an amplitude linear part at the time interval of the**

**observer.** Hence, we consider RW field existing as unrevealed or as weak interactions in natural processes. Nevertheless, this influences directly on the whole surrounding material world.

Artificial production of heterogeneities in the RW field can cause its significant visualization.

According to the concept of the physical field, which was called by Einstein as the most important discovery in physics since Newton's time, every body generates a force field in the ambient space (for example, the electric field occurring if the body has an electric charge). This force field becomes apparent when a test body located in a certain point is influenced by a force.

Discovery of the fields of this scale allows define this concept more accurately. I would like to restate the information mentioned above in the following way: every non-homogeneity of physical vacuum (aether), which is registered by our perception or by measuring instruments as a physical object or a physical field, interferes with RW (according to other interpretations, it absorbs or rereflects RW, or becomes excited) producing new wave fields. This perceived physical field has frequency which is higher than RW frequencies. It is perceived as static in the time interval of observation. Hence, the field generates a charge and not the reverse. Any linear or non-linear transmission (motion) of a material or field object changes non-homogeneity which is generated by this object.

A question about measuring of parameters of the Universe remains open. Can an oscillation of the period of  $T=14$  billions years and of the amplitude of  $A \sim T$  be seen, perceived, registered or measured?

The used literature and references are not cited in the article due to its great volume. The reader can familiarize with them at the web-site of <http://www.efir.com.ua>. The complete text of the article and other materials can be received from the author.

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# History pages

## To the Question of Work Made by Electrostatic Field

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We know some simple examples of work making due to the forces, which appear in electrostatic field. Since the field itself does not require energy consumption from the source (not taking into account the charge leakage), then free energy can be received with these forces. The first phenomenon that we are going to consider is a phenomenon of **electrostriction**. Mechanical forces appearing in dielectric under the influence of electrical field tend to deform it. Sometimes these forces are small, but they can be huge in special dielectrics. The character of deformation also depends on non-linearity of electrical field. Suffice it to remember that heating of a body takes place during deformation, and we can make a conclusion on possible using of the given effect in practice. Periodical deformation can be created due to the rotor or any other methods to change the field.

The second effect is not so popular. It was found by Hertz in 1881 that there is a rotation of dielectrical cylinder (or ball) in permanent electric field if it is created in some liquid or in gas (see Fig.1).

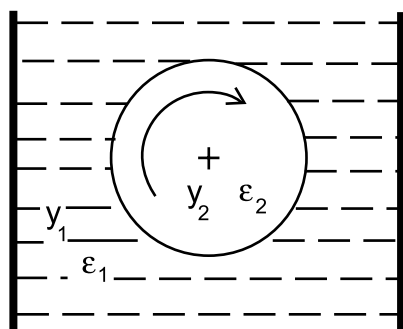


Fig.1

Here  $\epsilon_1$  is a dielectrical permittivity of the liquid,  $\epsilon_2$  is a dielectrical permittivity of the rotor,  $\gamma_1$  is a conductivity of the liquid and  $\gamma_2$  is a conductivity of the rotor. This effect was discovered by Hertz, then it was described by G. Quincke, Germany. Also Japan scientist I. Sumoto studied the effect in 1955. Modern research work was made by K.M. Polivanov, Moscow. There is the so called equation by Polivanov describing special conditions, which are necessary to begin rotation ( $\epsilon_1/\epsilon_2 = \gamma_2/\gamma_1$  is the Polivanov's condition).

Forces of electrostatic field produce this rotation and it is a real free energy system that can trap energy from inner structure of potential field. Let's try to describe the mechanism of this effect and then we'll be able to increase the power of the system up to the level of industrial application. So, why does it work? To my mind, there are some differences in conditions for polarization of the rotor and molecules of liquid or gas those are surrounding the rotor since there is a difference in permittivity and conductivity.

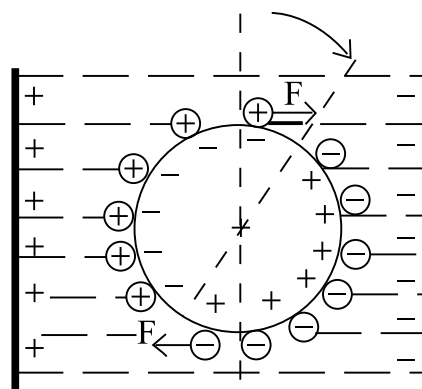


Fig.2

Due to this reason the molecules are polarized both by the field of electrodes and by the field of rotor. The rotor is polarized in the electrical field of electrodes, and molecules of liquid on its surface are polarized by the electric charge of the rotor, but not according to direction of the field. So, the rotor is surrounded by "screen" of molecules on its surface. The electric charge of this screen partially compensates the field of electrodes.

When some angle is created by the first initial turn, there is some part of the rotor surface, where molecules of liquid on the surface of the rotor are attracted to electrodes and it is the reason for future rotation. After some angle of the turn the polarization in this point of the rotor surface is changed but new molecules are incoming in the so called "sector of attraction" and the rotation is always accelerated. This well-known effect of 1881 is a very good example of possibility to produce useful work in load by means of electrostatic field only.

# Letter On Hertz-Quincke-Sumoto Effect

from Doug Marett

Email: [doug.marett@sympatico.ca](mailto:doug.marett@sympatico.ca)

One more interesting effect is known as Faraday effect. In 1836 Faraday noted that raising of liquid upwards takes place in condenser with liquid dielectric (plates are installed vertically). During this process electrostatic field makes the work against gravity. A. Gyemant in 1926 established that value of this force is proportional to the square of voltage on condenser. Later in 1955 this phenomenon was studied in details by I. Sumoto, Japan. That's why in physical encyclopedias this effect is called "Faraday-Sumoto effect". In Tareev's book [1] it is pointed: "Under high voltage this phenomenon leads to flowing and turbulent boiling of liquid". I should remember for those, who see nothing unusual here, that it does not necessary to consume the power from initial source. Creating an initial field in electric capacitor, then we can use the received mechanical work. It is evident that the gradient of electrical field creates the conditions for movement of liquid dielectric. A task to create conditions for liquid circulation is more complex, but it has solution, if we take into account the presence of one more static field, i.e. gravitational field. Joint action of electrostatic and gravitational fields stipulates the circulation of liquid dielectric even in the simplest constructions. Besides, electrostatic field can be partially screened.

The analyzed examples should draw attention of experimenters to these obvious ways of how to create useful work by means of electrostatic field.

## References

1. Tareev B.M. Physics of dielectrical materials, Moscow, Energoisdat, 1982, p.199 – 200.

*Editor: Below we publish the comments of our reader.*

...As far as I can tell, the original reference by Hertz is "On the Distribution of Electricity over the Surface of Moving Conductors", Wiedemann's Annalen, 13, pp.266-275, 1881. Hertz's discussion of this phenomenon is cursory at best, having very little experimental work included. The real phenomenon appears to have been discovered by W. Weiler in 1893 (Zeitschrift fur den Physikalischen und Chemischen Unterricht, Vol.6, pp194-195). Weiler observed that a glass cylinder placed in a poorly conducting liquid between two spherical electrodes began to rotate when the electrodes were connected to an electrostatic generator. In 1896, George Quincke reported the same phenomenon and published a comprehensive report on it. This was in Annalen der Physik, Ser.3, Vol. 59, pp.417-486. Subsequent investigators have tended to attribute the discovery to Quincke, when in fact Weiler was the first to pioneer the work.

I do know that P.E. Secker et al. performed work on this field, references of which are available in the English language. These are:

- P.E. Secker, et al., (1968) Journal of Applied Physics, Vol. 39, pp.2957-2961, and  
P.E. Secker, et al., (1970) Journal of Physics D: Applied Physics Vol.3, pp 216-220.

I hope that this information might be of use to you.



## The Foundations of Physchemistry of Micro World

Ph. M. Kanarev

### The Second Edition

**The book was published in Russian and English;  
you can also read it at <http://book.Kanarev.innoplaza.net>**

The new axiomatic of natural sciences is given in the book; on its basis, quantum physics and quantum chemistry have been returned to the classical way of development. The first steps are made on this way, which have led to discovery of the structure of the photon, the electron, and the principle of the formation of the atomic nuclei, the atoms and the molecules.

The Planck's Law of radiation of perfect blackbody is given on the basis of classical concepts, and the connection of quantum phenomena with the laws of classical physics is proved.

The application of the new theoretical results to the solution of practical energy tasks on the basis of plasma electrolysis of water is shown. Due to this electrolysis, additional heat energy and the energy containing gases (hydrogen and oxygen) are generated. Cold Nuclear Transmutation of the atomic nuclei of alkaline metals and the atomic nuclei of the cathode material takes place during plasma electrolysis of water.

The book is intended for physicists, chemists and other specialists who are seeking the new directions for understanding the foundations of the micro world and the new energy sources.

# Comments to Electro-Reactive LIFTER News

Alexander V. Frolov, Russia

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<http://www.faraday.ru>

March 21, 2003 we got news from France about electro-reactive propulsion system.

## ***Blaze Labs reached 100g PAYLOAD level.***

You will find all the details of the Saviour's experiment at: <http://blazelabs.com/exp14.htm>.

This electro-reactive ionization-flying model requires 46 kVolt, 4 mA, i.e. about 200 watts to fly with 100 g useful load.

It is interesting to note that Jean-Louis Naudin's previous opinion of 1997 – 1999 about priority of the Frolov's asymmetrical capacitor now is changed. Sometimes people wish to re-write the history. It is possible and it is easy. Naudin's web page about <http://jnaudin.free.fr/lifters/story.htm> (see Fig. 1) is not started from the real beginning of the story. He forgot our discussion of 1997 and also photos and MPEG video I have send to him when he has started his way in electrograviticis.

If you remember the name of Naudin's first asymmetrical capacitor "Frolov's Hat" (see Fig.2) then you know why there is this name of this technology. But really it is not important to try for some serious reply from Jean since he has no personal post address, phone, or his photo on the web site...

Also it can be useful to visit this page <http://www.faraday.ru/t-cap.html> to know about something **more important than electric ionization flying models (Lifters)**, since it is just a reactive ionization way, which is similar to rockets.

Ideas now developing by us are not aimed to increase the power level (from 1 gram to 100 gram propulsive force). It is **a qualitatively new idea**; it is really electrograviticis instead of "electro-reactive Lifter".

So, **what is about real "history of the question" instead of the French version?** The question here is not about a priority, it is nonsense after T.T. Brown's

patents. As an example the NASA patents on asymmetrical capacitors can be mentioned since the ideas were opened before the NASA patent and there is nothing new in it. The problem is that people who develop reactive ionization Lifters develop only primitive reactive technology. **It is not essence of T.T. Brown research but it is the distortion of his ideas.**

So, the team in France is working to develop and support ideas of secondary and wrong method. Why? Perhaps they either do not see the real way or have payment for the wrong way **to mask a real work.**

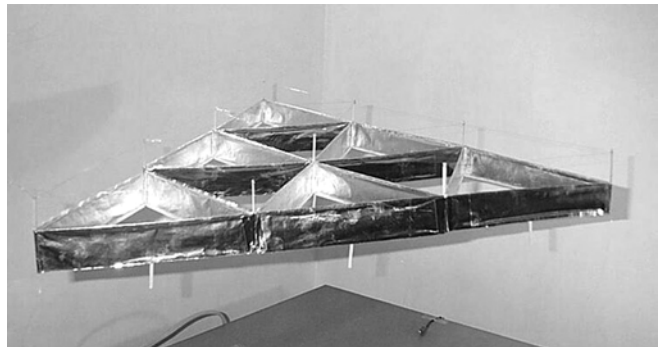


Fig. 1

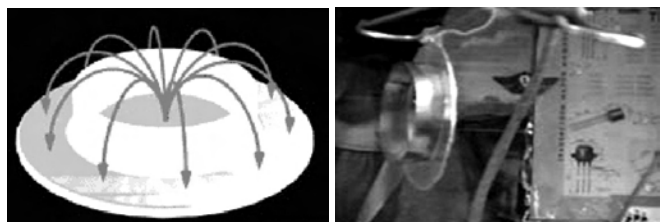
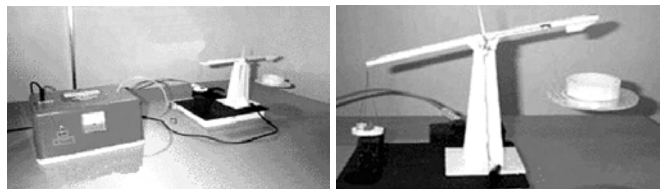


Fig. 2

**Josh Werrmann** (Email: jsh111@yahoo.com): I wanted to ask you a few questions about an article titled "Highly Efficiency Electrolysis" by A.V. Frolov. In this article it is stated that Dmitry A. Latchinov patented a method for electrolysis, where one of the electrodes is insulated completely from the water. It is also stated that another scientist, Igor Goryachev, used a method of pulsed electric fields. I don't know if you know, but inventor Stanley Meyer has a patent that covers both of these processes together, in a way. His patent is U.S. patent number: 4936961. Take a look at this. In the patent it states EXPLICITLY that there is a pulsed electric field, where a condition of NO CURRENT is preferred. This is very similar to the above to Russian scientists, except that the patent states a condition of resonance is necessary. I am wondering do the two scientists that are described require resonance in their devices? Or just plain pulsed electric fields, where one electrode is insulated from water.

Another patent I would like to refer you to is Archie Blue's electrolyser, U.S. patent number: 4124463. This device is similar to A.V. Frolov's idea, to get the oxygen and hydrogen bubbles off the electrodes, except he uses a blower to blow air in the cell, instead of rotating the cell like A.V. Frolov does. His invention also uses the conductivity current to work.

**Alexander V. Frolov:** As far as I know resonance is not created in this case. The main idea is the removal of gaseous film which appears on the surface of electrodes by rotation or some other methods.



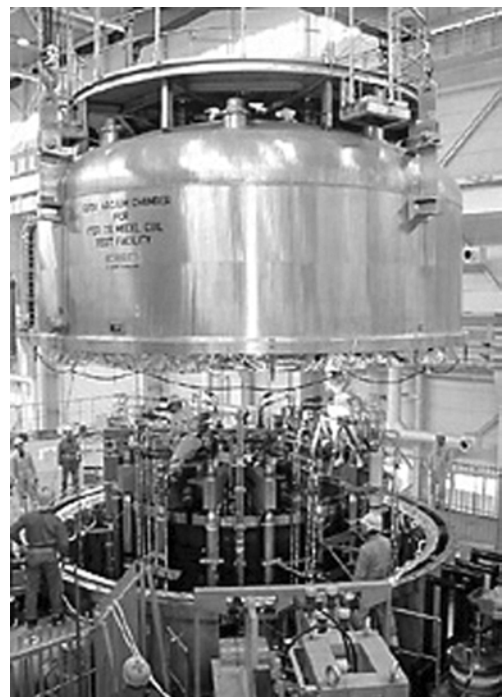
[http:// www.sciteclibrary.ru](http://www.sciteclibrary.ru)

The system of 150-tons magnets which have been developed by scientists of the USA, Japan and Russia opens a new era of safe and unlimited energy. In this system nuclear fusions serve as a source of energy. They accumulate heavy chemical elements not by means of nuclear reactions but by ultrahigh plasma pressure.

After supplementary research is held which aims to reduce manufacturing costs of the giant magnet weighing 925 tons, this magnet will be produced and demonstrated at the opening of the International Thermonuclear Experimental Reactor (ITER). This magnet in its turn will become a part of a bigger system, that is combined into a magnet weighing approximately 10 000 tons. The task of ITER is the demonstration of the process of nuclear fusion, as an energy source. During the process of nuclear fusion the light elements are combined by immense pressure, thus producing heavier elements. During this production process a lot of energy is emitted. The task of giant high-power magnets is to create magnetic fields, which must hold and control plasma, or to charge electrically the gas, in which the fusion is being held.

In Japan the system of 150-tons magnets serves as adjustment system of 925-tons magnets, which will be finally put into operation and heat up the ITER plasma. Two additional giant magnet systems will confine the plasma and will control its form. The model for one of them is presently being examined in Germany; the model of the other is in project.

Cylindrical 150-tons magnets have three main parts: external module, built by the Japanese team, internal module, built by the American team and a thin rod in the core which is equipped with process control equipment. Three different rods were separately checked, two of them were built in Japan, another in Russia.





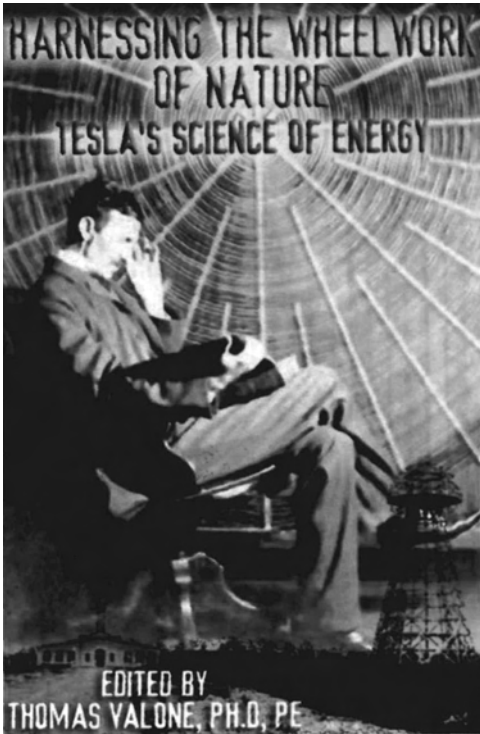
## BOOKS REVIEW

# Harnessing the Wheelwork of Nature

(340 pgs. Adventures Unlimited Publishers, 2002)

Thomas Valone

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It is a new book by **Thomas Valone**, who edited this anthology in time for the **Wardenclyffe Tower Centennial (1903-2003)**. This book presents for the first time, the feasibility argument for Tesla's most ambitious dream, the wireless transmission of power. Pictured on the book's cover near his feet, the 187-foot Wardenclyffe Tower was Tesla's means to deliver natural 8 Hz electricity anywhere in the world, by longitudinal waves.

Unknown to most electrical engineers, Nikola Tesla's dream answers the energy crisis worldwide, saves electrical conversion losses, and provides a real alternative to transmission lines. In Dr. Corum's contributed papers, he explains Tesla's magnifying transmitter, which Tesla compared to a telescope. Corum points out that "the tuned circuit of his magnifying transmitter was the whole earth-ionosphere cavity resonator." This fact helps explain why Tesla stated, "When there is no receiver there is no energy consumption anywhere. When the receiver is put on, it draws power. That is the exact opposite of the Hertz-wave system...radiating all the time whether the energy is received or not." Thus, with Tesla's futuristic transmission of power, source dissipation will only be experienced when a load is engaged in a tuned receiver somewhere on the earth. This fact alone represents **a major leap forward** in electrical transmission efficiency, even one hundred years later.

Why wasn't the prototype of Wardenclyffe finished in 1903? Tesla offered this visionary conclusion: "The world was not prepared for it. It was too far ahead of time. But the same laws will prevail in the end and make it a triumphal success... Let the future tell the truth and evaluate each one according to their work and accomplishments. The present is theirs; the future, for which I really worked, is mine."

Up until now, there has been a general malaise regarding the lack of scientific comprehension of Tesla's greatest dream. For example, the Serb National Federation notes, "With the exception of the first biography of Tesla by John J. O'Neill, science editor of the *New York Herald Tribune*, and published in 1944, unfortunately no biographer since has had the necessary scientific/engineering academic credentials to discuss Tesla's work in the various fields." Contributors to ***Harnessing the Wheelwork of Nature*** are primarily physicists and engineers who are experts in Tesla technology. Their wealth of knowledge demonstrates their mastery of this extraordinarily progressive and technical subject. Finally, the best academic credentials have been brought to bear on the world's greatest electrical futurist.

This is a very readable and profusely illustrated reference volume on wireless transmission of power, besides being an excellent biographical gold mine of Tesla history. Nick Cook, editor of *Jane's Defence Weekly* and author of *The Hunt for Zero Point* says, "Tesla is one of the great overlooked geniuses of science and electricity. His full story deserves to be told. Tom Valone sheds important new light on his life and work."

**Integrity Research Institute** will hold a Tesla Energy Conference & Expo on November 8-9, 2003 to celebrate the Wardenclyffe Tower Centennial (1903-2003) in conjunction with the Tesla Wardenclyffe Project, Inc. ([www.teslascience.org](http://www.teslascience.org)).

See [www.IntegrityResearchInstitute.org](http://www.IntegrityResearchInstitute.org) for more details.